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ONTARIO GEOLOGICAL SURVEY

Open File Report 6005

Report of Activities, 1999
Resident Geologist Program

Thunder Bay South Regional Resident Geologist Report:
Thunder Bay South District

by

B.R. Schnieders, J.F. Scott, M.C. Smyk and M.S. O'Brien

2000

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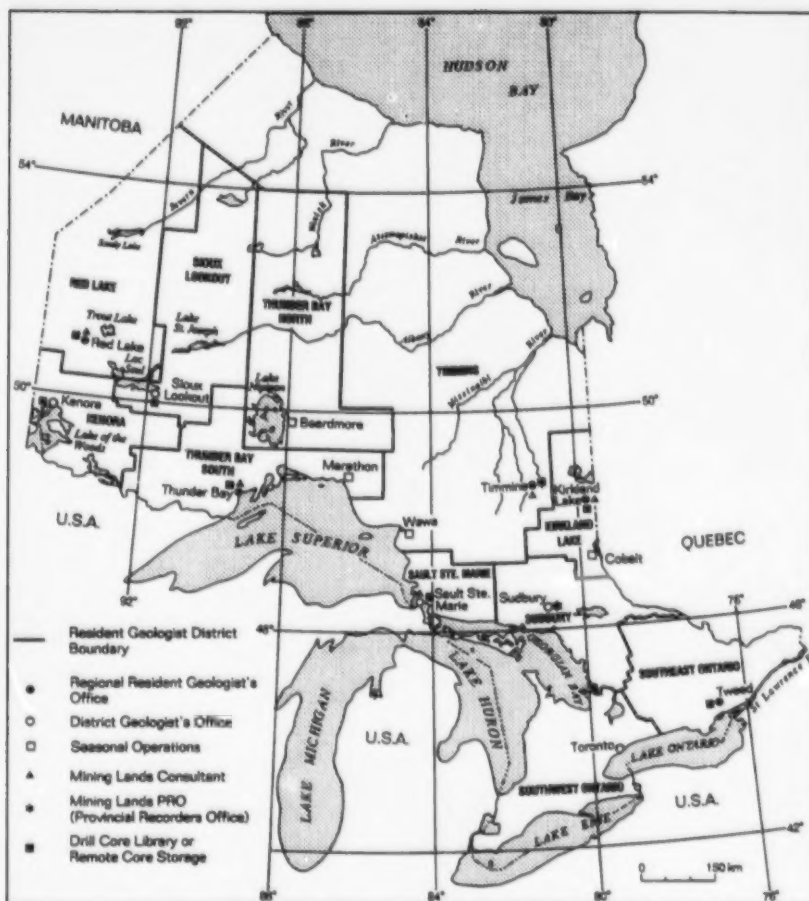
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**Ontario Geological Survey
Regional Resident Geologist Program**

**Thunder Bay South Regional Resident Geologist (Thunder Bay South
District)—1999**

by

B.R. Schnieders, J.F. Scott, M.C. Smyk and M.S. O'Brien

2000

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Thunder Bay South Regional Resident Geologist (Thunder Bay South District)--1999

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INTRODUCTION

The Thunder Bay South District covers an area from Calm Lake, west of Atikokan, east to White River, and north to Armstrong from the U.S. border. The District Program is based in Thunder Bay, but also maintains a seasonal field office in Marathon.

MINING ACTIVITY

There were four producing, precious and base metal mines, as well as a marble quarry, several amethyst producers and an agate mine in the Thunder Bay South District in 1999.

Agate

Thunder Bay Agate Mine

The Thunder Bay Agate Mine opened in July, 1997, and is located in MacGregor Township, on the west side of Highway 527 (Spruce River Road), 1 km north of the intersection with Highway 11-17 (i.e. the Expressway). The mine is owned by D. Seargeant and N. Maunula. It is estimated that up to 30 000 people visited the site in 1999 (D. Seargeant, personal communication, 2000). In addition to the mining of agate for export and visitor picking, a new agate vein was exposed by stripping in 1999 (ibid).

Agate occurs as a conformable layer or vein hosted by flat-lying, Animikie sedimentary rocks, in contact with a diabase sill. The agate layer varies up to 1 m in width and has been traced by stripping over a 1 km strike length. The banded and variegated agate has been previously referred to as fortification agate and Current River agate, and varies in colour (e.g. colourless, white, grey, black, yellow, orange, blue, beige, buff and red). The agate likely formed in an open-space environment, as evidenced by stalactitic textures and concentrically zoned orbicules (Thunder Bay Agate Mine, World Wide Website, <http://www.agatamine.com>).

Amethyst

Two areas northeast of Thunder Bay are well-known for amethyst veins and production. In the area along the Magone Lake Road, north of MacGregor Township, five sites see periodic, small-scale extraction of amethyst. In MacTavish Township, eight deposits are accessible from the Trans-Canada Highway, four of which operate as seasonal tourist attractions. The Blueberry Amethyst patch also operates as a seasonal tourist attraction, north of Kakabeka Falls.

Local deposits and mines are listed below:

<u>Deposit / Mine</u>	<u>Location</u>	<u>Owner(s)</u>
Amethyst Mine Panorama	McTavish Twp.	S. and T. Lukinuk
Bak Quarry	McTavish Twp.	D. Bak
Blueberry Amethyst Patch	Oliver Twp.	J. and T. Hakala
Blue Points Amethyst Mine	McTavish Twp.	F. Grann
Boulder Creek Amethyst	North of MacGregor Twp.	C. Anderson
Breezy Mountain Amethyst Mine	McTavish Twp.	T. Twomey
Crystal Creek Amethyst Mine	North of MacGregor Twp.	R. Hietapakka
Diamond Willow Amethyst Mine	McTavish Twp.	D. Noyes
Gem Mountain Amethyst Mine	North of MacGregor Twp.	O. and R. Harty
Keetch Amethyst Quarry	McTavish Twp.	N. Keetch
Ontario Gem Amethyst Mine	McTavish Twp.	P. Marino
Purple Haze Mine	North of MacGregor Twp.	M. and S. Grieve
Thibault Amethyst Quarry	North of MacGregor Twp.	D. Thibault
Welch Farm Amethyst	McTavish Twp.	C. Anderson

Stone

Ruby Lake Marble Ltd.

The Ruby Lake Marble Ltd. quarry, located approximately 10 km southeast of Nipigon, is owned and operated by D. MacAlpine and G. Landry. Variegated, multi-coloured, banded marble was quarried for landscaping stone. Approximately 398 tonnes of marble were quarried and shipped in 1999 (D. MacAlpine, personal communication, 2000). Additional information is provided on their World Wide Website (<http://www.rubylakemarble.com>).

This marble consists of metamorphosed, Mesoproterozoic, Rossport Formation (Sibley Group) dolostone and other, calcareous sedimentary rocks in the contact metamorphic aureole of Keweenaw diabase sills. It has previously been termed Nipigon River marble and was quarried from 1883 to ca. 1910 at a site on the eastern side of the Nipigon River, approximately 6 km west of the Ruby Lake quarry (Hinz *et al.* 1994).

Gold

David Bell Mine (Teck-Corona Operating Corporation)

Production from the David Bell Mine (Teck Corporation (50%) / Homestake Canada Inc. (50%)) from January 1, 1999 to December 31, 1999 consisted of 159 372 recovered ounces of gold (169 078 feed ounces) from 443 967 t milled, at a feed grade of 0.381 ounce Au per tonne (C. Duke, Teck-Corona Operating Corporation, personal communication, 2000).

Mineable and diluted ore reserve estimates as of January 1, 2000 were 3 877 800 t at a grade of 0.354 ounce Au per tonne, representing 1 373 098 ounces of contained gold (ibid).

A near-surface, mineral resource of 585 000 t, grading 0.120 ounce Au per tonne, lies at the west end of the David Bell Mine property, directly beneath Highway 17 (ibid).

Underground drilling carried out in 1999 was focused along the eastern margins of the main ore zone at depth. This drilling program added approximately 290 000 t to mine reserves (ibid).

Golden Giant Mine (Battle Mountain Canada Ltd.)

Production from the Golden Giant Mine from January 1, 1999 to December 31, 1999 consisted of 355 958 recovered ounces gold from 1 088 603 t milled at a grade of 10.82 g/t Au (378 624 feed ounces gold) (H. Lockwood, Battle Mountain Canada Ltd., personal communication, 2000). Reserves as of January 1, 2000, stand at 5 585 892 t at a grade of 9.62 g/t Au (i.e. 1 726 963 contained ounces gold, fully diluted) (ibid).

The Block 5 area (Lower Zone ore) was fully developed for mining from the top under the David Bell property (approximately 4235 elevation) to 4110 elevation. Mining has begun in the developed interval. The Block shaft is now within 70 metres of its projected bottom, at 3899 elevation. J. S. Redpath is doing this work. Following completion of the shaft and related infrastructure, main lateral levels will be driven to the ore, with ore silling expected to resume in early 2001.

Block 4b is the bottom of the Main ore zone. It will be developed starting in mid-2000 by an access drive from the deepened shaft and developed with captive sub-level methods from raises. A considerable amount of underground infrastructure is also included. Manroc Development of Manitouwadge is the principal contractor for this job. Plans are to start reopening the older, long-dormant mining blocks at the top of the mine in 2000, starting with extraction of the sill between 4875 and 4900 levels. This should give Golden Giant additional mining fronts to extract the ever-increasing number (i.e. approximately 70 in 2000, up from approximately 50 in 1999) of stopping blocks required to maintain 3000 tonnes per day from the narrower ore now available (ibid).

Williams Mine (Williams Operating Corporation)

The Williams Mine (Teck Corporation (50%) / Homestake Canada Inc. (50%)) produced 423 645 ounces of gold from 2 432 248 tonnes of ore, at a head grade of 0.183 ounce Au per tonne, from January 1, 1999 to December 31, 1999, at a cost of approximately \$303_{Can} per ounce. (R. Reukl, Williams Operating Corporation, personal communication, 2000). Proven and probable ore reserves, as of January 1, 2000, stand at 25 394 000 t at a grade of 0.159 ounce Au per tonne (ibid).

Surface exploration drilling focused on the western extension of the "C" zone on two claims acquired from Battle Mountain Gold; in December, 1999, the rights on an additional four claims were acquired. A total of 6480 m of drilling was carried out on these claims in 1999 and they are currently the focus of a 10 600 m drilling program designed to expand the inventory of lower-grade ore to be mined in the open pit (ibid). Underground, in the "C" zone area, a total of 5051 m of exploration and definition drilling was completed. Exploration of the western fringes of the main ("B") zone underground involved 2516 m of drilling to the Williams property boundary and along the depth extension of the ore zone. A total of 2933 m of underground definition drilling was completed in the "B" zone (ibid).

Platinum Group Elements

Lac des Iles Mine (North American Palladium Ltd.)

North American Palladium Ltd. produced palladium, platinum, nickel, copper and gold from its Lac des Iles minesite, 100 km north of Thunder Bay. Production figures for the first three-quarters of 1999 are given below (North American Palladium Ltd., World Wide Website, <http://www.napalladium.ca>):

Year	Tons Milled	Palladium (oz)	Gold (oz)	Platinum (oz)	Copper (lb)	Nickel (lb)
First three- quarters of 1999	728 194	46 507	3384	3459	943 089	654 929

THUNDER BAY SOUTH DISTRICT—1999

During the third quarter, the Company completed a major diamond-drill program totalling 166 000 feet (50 597 m) in 162 holes (North American Palladium Ltd., World Wide Website, <http://www.napalladium.ca>). North American Palladium Ltd. announced that it received a positive detailed feasibility study on the proposed major expansion of the Lac des Iles mine. The feasibility study was prepared by AGRA Simons Limited and supports an expansion of the operation to 15 000 tonnes per day, from the current 2 400 tonnes per day. AGRA Simons concluded that the expansion was technically feasible and economically viable and recommended its development as an open pit mining operation combined with ore processing facilities to produce a bulk flotation concentrate. The expanded operation is expected to produce an annual average of 248 900 ounces palladium, 24 200 ounces platinum, 19 100 ounces gold, plus copper, nickel and cobalt over an eleven-year mine life (ibid).

The study follows a core drilling program during 1999, which significantly increased the geological resource at Lac des Iles to over 5.0 million ounces of palladium. As a result of the feasibility study, North American Palladium Ltd. reported a new mineable proven and probable reserve of 74.2 million tonnes with an average grade of 1.64 g/t Pd, 0.18 g/t Pt, 0.14 g/t Au, 0.066% Cu, and 0.055% Ni, based on a cut-off grade of 0.92 g/t Pd equivalent. The reserve is diluted only on the eastern side of the deposit, where high-grade, reserve blocks in contact with the barren hanging wall are diluted by 15%. The average strip ratio over the life of the mine is 2.26:1. North American Palladium Ltd. reported an additional measured and indicated resource of 23.5 million tonnes at 1.46 g/t Pd, 0.18 g/t Pt, 0.11 g/t Au, 0.049% Cu and 0.052% Ni, which is located outside the proposed pit shell (North American Palladium Ltd., World Wide Website, <http://www.napalladium.ca>).

Table 1. Mine production and reserves in the Thunder Bay South District in 1999.

Mine	Production to end of 1998		Production in 1999		Reserves at end of 1999	
	Tonnage @ Grade	Total Commodity	Tonnage @ Grade	Total Commodity	Tonnage	Grade
David Bell Mine	5 609 398 t @ 0.500 ounce Au per tonne	2 787 880 ounces Au	443 967 t @ 0.381 ounce Au per tonne	159 372 ounces Au ¹	3 877 800 t	0.354 ounce Au per tonne
Golden Giant Mine	13 330 526 t @ 12.13 g/t Au	4 973 312 ounces Au	1 088 603 t @ 10.82 g/t Au	355 958 ounces Au	5 585 892 t	9.62 g/t Au
Lac des Iles Mine	3 859 331 tons (grade unknown)	346 434 ounces Pd, 23 195 ounces Pt, 21 547 ounces Au, 5 276 400 lbs. Cu, 4 161 166 lbs. Ni	728 194 tons milled (grade unavailable) (n.b. production for first three- quarters, 1999)	46 507 ounces Pd, 3384 ounces Au, 3459 ounces Pt, 943 089 lbs. Cu, 654 929 lbs. Ni (n.b. production for first three- quarters, 1999)	74.2 million tonnes	1.64 g/t Pd, 0.18 g/t Pt, 0.14 g/t Au, 0.066% Cu, and 0.055% Ni, at a cut off grade of 0.92 g/t Pd equivalent
Williams Mine	27 048 156 t @ 0.217 ounce Au per tonne	5 561 170 ounces Au	2 432 248 t @ 0.183 ounce Au per tonne	423 645 ounces Au	25 394 000 t	0.159 ounce Au per tonne

¹includes 512 ounces recovered from sedimentation pond in 1998

ADVANCED EXPLORATION

Franco-Nevada Mining Corporation Limited (Hemlo Project)

Franco-Nevada owns the western, down-dip extension of the Hemlo orebody, adjacent to the Williams Mine. Previous surface drilling on very wide spacings had inferred a resource of 1.748 million ounces of gold on Franco-Nevada's property (*Canadian Mines Handbook*, 1999-2000, p.174).

In March, 1999, Franco-Nevada completed a two-year, \$4.9 million underground exploration program. A total of 1000 m of underground drift development, including 6 diamond-drill stations and 20 056 m of diamond drilling were completed in 40 holes. This drilling tested the down-plunge extent of the Hemlo ore body over a strike length of 700 m and a vertical extent of approximately 792 m. Multiple horizons of B-Zone and C-Zone gold mineralization were encountered (Franco-Nevada Mining Corporation Limited, World Wide Website, <http://www.franco-nevada.com>). In June, 1999, an estimate of 10.8 million tons grading 0.216 ounce Au per ton (i.e. 2 328 000 contained ounces) was announced (First Quarter Report to Shareholders, Franco-Nevada Mining Corporation Limited, June 30, 1999). This is an increase of approximately 570 000 ounces at a 16% higher gold grade from the previous resource estimate. Technical data are being reviewed by Teck Corporation and Homestake Canada Inc., owners of the Williams Mine (ibid).

EXPLORATION ACTIVITY

There were over 100 active exploration projects in the Thunder Bay South District in 1999 (Table 3; Figures 1a,b; 2a,b). The Ontario Prospectors Assistance Program (OPAP) provided over \$500 000 to 41 individuals in the district. Those designations are also noted in Table 3.

Gold Exploration

Landis Mining Corporation conducted diamond drilling on the Fountain Lake property, adjacent to, and southeast of, the **Moss Lake Gold Mines Ltd.** deposit which contains a proven and probable reserve of 462 000 tonnes at 6.7 g/t Au (Landis Mining Corporation, World Wide Website, <http://www.landis.ca>; News Release, February 10, 1999). This higher-grade reserve anchors a drill-indicated, bulk tonnage, geological resource of over 2.5 million ounces of gold, contained within 82 million tons at a grade of 0.031 ounce per ton gold (1.06 g/t Au). The Fountain Lake property is east of the **Pele Mountain Resources Inc.** Ardeen Mine property, which has an inferred resource of 1 082 000 tonnes at 14.4 g/tonne gold (ibid).

Band-Ore Resources Ltd. drilled 12, short, diamond-drill holes on the Q-9 (Cunniah Lake) property, 120 km west of Thunder Bay, in the Saganagons Lake area (Band-Ore Resources Ltd., World Wide Website, <http://www.band-ore.com>; Press Release, February 25, 1999). One drill-hole intersected 25.5 g/t Au and 92 g/t Ag over 1.1 m. A 423 kg sample of high-grade material containing visible gold, collected from outcrop, returned a weighted average of 356.3 g/t Au and 850 g/t Ag (ibid).

RJK Explorations Ltd. and **Greater Lenora Resources Corporation** completed four diamond-drill holes, totalling 1 350 feet (409 m) on their Goldie property (<http://www.kasnergrouppco.com>; Joint Information Release, November 25, 1999), located in the Matawin belt, to test gold-in-till anomalies delineated by A. Bajc of the Ontario Geological Survey (Bajc 1999a). Drill hole GD99-3 intersected 40 feet grading 0.04 ounce per ton gold. Drill hole GLD99-4, drilled to test up-ice of the till anomaly, intersected a highly brecciated and silicified syenite, containing quartz veins and pyrite which assayed 0.05 ounce per ton gold over 40 feet (ibid).

Freewest Resources Canada Inc. completed a two-hole, diamond-drilling program, started in late 1999, on the Bylund property (adjacent to the Goldie property), joint-ventured (50% each) with **Greater Lenora Resources Corporation**. Earlier trenching on the property by the joint venture partners uncovered a 300 m-wide deformation zone containing numerous shear-fracture zones, characterized by intense iron-

carbonate, sericitic, albitic and siliceous alteration (Freewest Resources Canada Inc., World Wide Website, <http://www.freewest.com>; Press Release, January 21, 2000). The shear-fractured zones contain quartz veins and stockwork zones that returned channel sample assays of up to 4.1 g/t Au over 14.0 m, 1.1 g/t Au over 4.1 m and 123.0 g/t Au over 0.5 m (ibid). Till geochemical sampling undertaken by the Ontario Geological Survey (Bajc 1999a) had delineated two sampling sites, situated immediately up-ice from the deformation zone, containing a high number of pristine gold grains in the overburden. Specifically, the till sample sites contained 698 grains of gold (290 pristine) and 252 grains of gold (184 pristine), respectively (ibid). This target was tested by the two drill holes.

Although drill hole BY99-1 returned insignificant gold values, drill hole BY99-2 intersected a broad zone of intensely altered, deformed, volcanic breccia, characterized by moderate to intense ankeritic and sericitic alteration over 102.6 m (Freewest Resources Canada Inc., World Wide Website, <http://www.freewest.com>; Press Release, January 21, 2000). Quartz veins containing pyrite and arsenopyrite prevailed throughout the entire alteration and deformation zone. The entire zone graded 0.32 g/t Au over 102.6 m at a depth of 8.7 to 111.3 m, with assays ranging from 20 ppb to 5100 ppb Au. Narrow, higher-grade intervals were obtained in local zones with quartz veins and more intense pyrite-arsenopyrite mineralization. Such zones returned 4.56 g/t Au over 0.6 m, 4.59 g/t Au over 0.4 m and 5.10 g/t Au over 0.8 m (ibid). An additional 100 to 150 m (in width) of the deformation zone remains to be tested. Due to the low tenor of gold values obtained in drill hole BY99-2, the source of the numerous, pristine gold grains obtained in the up-ice, till sample sites has not been found. Additional detailed till sampling, to further characterize the anomaly and to refine future drilling targets, was slated for early 2000 (ibid).

RJK Explorations Ltd. and Greater Lenora Resources Corporation also diamond-drilled two holes on their Garden Lake property. Anomalous gold values were returned from carbonates, ferruginous dolomite and mudstones in the Garden Lake deformation zone (GLDZ). The GLDZ has been compared to the Larder Lake Break and its geology compared to that of Virginitown in the Kirkland Lake gold camp (ibid); Press Release, December 22, 1999).

Base Metal Exploration

Atikokan Resources Inc. conducted induced polarization (IP), down-hole electromagnetic (EM) geophysical surveys and diamond drilling on their Lumby Lake property. Assays from drill hole L98-02 included 56.5 g/t Ag and 1.07% Zn across 13.4 m (core width). Hole L98-03 intersected 54.7 g/t Ag, 1.59% Zn, and 0.7% Pb over 7.1 m (core width) (Atikokan Resources Inc., World Wide Website, <http://www.atikokan.com>; Press Release, March 2, 1999). Drill holes L98-04 and -05, extended the known mineralization to a length of 450 m and up to 40 m in width. Drill hole L98-05 intersected 0.59% Zn, 21.32 g/t Ag and 0.07% Pb across 43.92 m (ibid).

RJK Explorations Ltd., in joint venture with **Greater Lenora Resources Corporation**, conducted linecutting, an IP survey, stripping, trenching, prospecting and sampling on the Stares (Aldina Township) property (<http://www.kasnergrouppco.com>; Joint Information Release, September 10, 1999). Stripping on line 2100 uncovered disseminated and stringer sulphide minerals in a sericitic, altered, felsic metavolcanic rock (similar to the float boulder that assayed 0.6% Cu, 12% Zn, 4.2 % Pb, 359 g/t Ag and 5.52 g/t Au). The felsic unit is approximately 75 m wide. Selected grab samples assayed as high as 15.38% Zn, 0.47% Cu, 0.47% Pb, 106 g/t Ag and 1.19 g/t Au (ibid). Diamond drilling was ongoing at the time of writing in January, 2000

On the Rockstone Lake property, **RJK Explorations Ltd.** conducted linecutting, ground magnetometer and electromagnetic surveys, which outlined five conductive zones (*Canada Stockwatch*, April 27, 1999). Drilling was conducted in early January, 2000; results are pending.

Tandem Resources Ltd. optioned the Tilly Creek occurrence from its discoverer, prospector C. Bumbu. The copper-gold-silver-mineralized zone has been traced for 300 m along strike; it is up to 30 m wide. An airborne geophysical survey indicated that the zone could extend for approximately 9000 feet (2727 m) (*Toronto Business Wire*, November, 15, 1999). Selected grab samples within the zone samples have assayed over 5% Cu, 0.37 ounce per ton gold and 1.39 ounces per ton silver. The zone is parallel to the

nearby, northeast-trending Boundary Fault Zone (BFZ), which is considered by the authors to have potential to host a large-tonnage, low-grade copper-gold deposit. Diamond drilling was ongoing at the time of writing.

Atma Resources Ltd. optioned the Spider Lake property from **Major General Resources Ltd.** (Major General Resources Ltd., World Wide Website, <http://www.majorgeneral.com>; News Release, November 04, 1999). Atma Resources Ltd. can earn a 60% interest in the Spider Lake property by spending \$2.4_{Cdn} million in exploration expenditures over 5 years (ibid). The 13 km-long property hosts the recently discovered Starhill zone, from which grab samples assayed 7.4% Zn, 1.4% Pb, 1.5% Cu, 101 g/t Ag and 0.87 g/t Au (Schnieders *et al.* 1999). A pulse EM survey was completed in 1999 over the Starhill zone; diamond drilling is planned for early 2000 (Major General Resources Ltd., World Wide Website, <http://www.majorgeneral.com>).

Nickel-Copper-Platinum Group Element Exploration

Recent exploration, increases in the reserves at the Lac des Iles Mine of **North American Palladium Ltd.** and continued rises in the prices of platinum group elements (PGE) have helped to spark interest in PGE in the Thunder Bay South District. Recent drill results by **Starcore Resources Ltd.** and **ProAm Explorations Corporation** on their Samuels Lake property have also prompted staking activity and property options throughout the district. Several new PGE occurrences were discovered in 1999, including: Samuels Lake^{PE}; Block Creek*; Bulldozer Lake^{PE}, Haines Gabbro*; Legris Lake*; Moshkinabi Lake^{PE}, Nym Lake* and Tyko Lake^{PE}.
(*described below; ^{PE} see Property Examinations section, this report)

North American Palladium Ltd. conducted more than 49 000 m of diamond drilling in 1999, increasing the measured and indicated resources to 94.1 million tonnes grading 1.66 g/t Pd, 0.18 g/t Pt, 0.14 g/t Au, 0.062% Cu and 0.053% Ni (*The Northern Miner*, January 11, 2000). Their exploration in the Lac des Iles region consisted of detailed prospecting, overburden removal, mapping and bedrock sampling. The Lac des Iles, Tib Lake and Buck Lake properties were systematically prospected, with over 3000 samples collected. This activity resulted in the discovery of 15 new PGE occurrences (North American Palladium Ltd., World Wide Website, <http://www.napalladium.ca>). Fourteen of these occurrences are within the Lac des Iles complex. The highest assay of 22.92 g/t Pd came from a sample taken 2 km east of the mine site. East of the South Roby pit, extensive overburden removal, mapping and sampling have delineated new mineralized zones which have the potential to increase the Roby zone resource (ibid).

Starcore Resources Ltd. and **ProAm Explorations Corporation** conducted soil geochemical and geophysical surveys on their Samuels Lake project. Chip samples from the Southwest Point occurrence returned a weighted average of 2.8 g/t Pt+Pd+Au and 0.22% Cu over 3.4 m (Starcore Resources Ltd., World Wide Website, <http://www.starcore.com>; News Release, February 11, 1999). Drilling on the pipe-shaped, 250 m x 600 m, elliptical intrusion intersected, in hole SM-99-3, 0.82% Cu, 0.64% Ni and 0.8 g/t Pt+Pd+Au across 45.74 m (ibid; News Release, March 22, 1999). Starcore announced the results from drill hole SM-99-13, which intersected a mineralized section of 87 feet (m) grading 0.27% Cu and 0.17% Ni with anomalous cobalt values (ibid; News Release, January 11, 2000). The next program will concentrate on the area to the south and west of drill hole SM-99-3. A surface exploration program will also be carried out on the northern portion of the property, which has also yielded platinum- and palladium-mineralized surface samples and drill core. The companies will also carry out geophysical exploration programs on its other three airborne geophysical targets in the area (ibid).

Avalon Ventures Ltd. and **Starcore Resources Ltd.** optioned the Legris Lake property, 8 km southeast of the Lac des Iles Mine (Starcore Resources Ltd., World Wide Website, <http://www.starcore.com>; News Release, November 17, 1999). The property covers the 4 by 8 km Legris Lake mafic-ultramafic intrusive complex. Prospecting work, designed to investigate a 300 m long electromagnetic anomaly defined by previous workers, resulted in the discovery of platinum-palladium-gold-mineralized gabbro, assaying in the order of 2.48 g/t Pd, 0.40 g/t Pt and 0.34 g/t Au, which was subsequently confirmed in check sampling carried out by Avalon (ibid). Three select grab samples and one composite grab sample collected by

Avalon from the occurrence, over an area measuring 5 by 10 m, averaged 3.22 g/t PGE along with 0.33% Cu and 0.10% Ni (ibid). Line cutting and ground magnetic and IP surveys were completed in January, 2000 (*Canada Stockwatch*, January 12, 2000). Diamond drilling is slated for February, 2000 (ibid).

North Atlantic Nickel Corp. drilled two holes on its Blake Township property in 1999. Hole BP-99-1 intersected 1.26 m grading 0.16% Ni, 0.20% Cu, 72 ppb Pd, and 146 ppm Co in a taxitic-textured gabbro (North Atlantic Nickel Corp., Press Release, April 21, 1999). **Dumont Nickel Inc.**, through an agreement with North Atlantic, can vest in a 50% interest in the Blake project by incurring expenditures of \$400 000 within 18 months and up to a 65% interest by cumulative expenditures of \$640 000 over 30 months; Dumont has agreed to issue 250 000 shares to North Atlantic (Dumont Nickel Inc., World Wide Website, <http://www.dumontnickel.com>; News Release, September 27, 1999). A 1600 line-km airborne magnetic and gradiometer survey was flown in December 1999 (ibid; News Release, December 7, 1999) prior to the start of a diamond-drill program (ibid; News Release, December 15, 1999).

Band-Ore Resources Ltd. completed a three-hole diamond-drill program on their Nym Lake property, 15 km southeast of Atikokan (Band-Ore Resources Ltd., World Wide Website, <http://www.band-ore.com>; Press Release, November 02, 1999). Anomalous values of 202 ppb Pt+Pd over 28 m (including 0.5 g/t Pt+Pd over 2 m) and 166 ppb Pt+Pd over 43 m (including 0.46 g/t Pt+Pd over 2.6 m) (ibid). Five of six previous grab samples, collected along a 200 m portion of the ultramafic intrusive host, assayed in excess of 1 g/t Pt+Pd, in addition to anomalous copper and nickel values. One grab sample assayed 3 g/t Pt+Pd, 0.45% Cu, 0.08% Ni and 2.9 g/t Ag (ibid; Press Release, May 03, 1999).

East West Resource Corporation and various joint venture partners, such as **Canadian Golden Dragon Resources Ltd.** and **Colby Resources Corp.**, have assembled 14 PGE properties in the Thunder Bay area, including several in Mesoproterozoic, Nipigon basin, mafic to ultramafic intrusive rocks (*Canadian Stockwatch*, January 13, 2000). East West and Golden Dragon are jointly earning a 50% interest in the Wolf Mountain and Disraeli Lake properties from Avalon Ventures Ltd. (Avalon Ventures Ltd., World Wide Website, <http://www.avalonventures.com>; News Release, October 07, 1999). Values as high as 7.8 g/t Pt+Pd in weathered peridotite were obtained by Avalon in 1997 (ibid).

Prospectors **W. Gilbert** and **D. Gillis** discovered PGE-mineralized hornblendites and amphibolitized, ultramafic intrusions in the Block Creek area, approximately 15 km southeast of the Lac des Iles Mine. Grab samples returned up to 541 ppb Pd, 487 ppb Pt (W. Gilbert, Prospector, personal communication, 1999).

Prospectors **J. and J. Hackl** discovered a new PGE occurrence on their Haines Township (Haines gabbro) property during an OPAP-assisted prospecting program. One grab sample, collected by Resident Geologist staff, returned 2513 ppm Cu, 9029 ppm Ni, 4778 ppb Pd, 522 ppb Pt and 78 ppb Au (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Higher PGE values, ranging up to 38 g/t Pd, were reported from previous grab samples (J. Hackl, Prospector, personal communication, 1999).

Table 2. Assessment files received in Thunder Bay South in 1999.

Abbreviations					
AEM	Airborne electromagnetic survey	Lc	Linecutting		
AM	Airborne magnetic survey	Met	Metallurgical testing		
ARA	Airborne radiometric survey	OD	Overburden drilling		
Beep	Beep Mat survey	ODH	Overburden drill hole(s)		
Bulk	Bulk sampling	OMIP	Ontario Mineral Incentive Program		
DD	Diamond drilling	OPAP	Ontario Prospectors Assistance Program		
DDH	Diamond drill hole(s)	PEM	Pulse electromagnetic survey		
DGP	Down-hole geophysics	PGM	Platinum group metals		
GC	Geochemical survey	Pr	Prospecting		
GEM	Ground electromagnetic survey	RES	Resistivity survey		
GL	Geological Survey	Samp	Sampling (other than bulk)		
GM	Ground magnetic survey	Seismic	Seismic survey		
GRA	Ground radiometric survey	SP	Self-potential survey		
Grav	Gravity survey	Str	Stripping		
HLEM	Horizontal loop electromagnetic survey	Tr	Trenching		
HM	Heavy mineral sampling	UG	Underground exploration/development		
IM	Industrial mineral testing and marketing	VLEM	Vertical loop electromagnetic survey		
IP	Induced polarization survey	VLFEM	Very low frequency electromagnetic survey		

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Adrian and Marks townships	Koivisto, R.	1997	Pr, Samp	OP97-035	52A05/NW
Adrian Township	RJK Explorations Ltd., Fenwick, K.	1999	GEM, GM	2.19539	52A05/NW
Aldina Township and Batwing Lake	Kukkee, R.	1998	Pr, Samp	2.19425	52B08/NE
Armistice Lake area	Lac des Iles Mines Ltd.	1998	Str	2.18686	52H05/SW
Baker and Freeborn townships	Maitland, T.	1997	GEM, GM, Pr, Tr, Samp	OP97-339	52B13/SW
Blake Township	North Atlantic Nickel Corp.	1998-99	DD	2.19462	52A03/NW
Boot Bay and Henderson Lake area	Hackl, J. & J.	1998	IP, RES, Lc	2.18684	52B15/SE
Bray Lake area	Fenwick, K.	1997	Pr, Samp	OP97-210	42E03/NE
Brothers and Laberge townships	Lac Exploration Inc.	1998	GC	2.19404	42C12/NW/NE
Brothers, Bomby and Laberge townships	Lac Exploration Inc.	1999	Samp	2.19638	42C12/NW/NE
Burchell Lake area	Newhawk Gold Mines Ltd.	1998	DD	2.19216	52B10/SE
Cecil Township	Gionet, G. & M.	1997	GM, Pr, Str, Tr,	OP97-201	42F04/SE

THUNDER BAY SOUTH DISTRICT—1999

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
			Samp, Beep		
Cecil Township	Noranda Inc.	1997	DD, Str, Samp, Beep	2.19285	42F04/SE
Cecil Township	Noranda Inc.	1999	PEM	2.19698	42F04/SE
Cirrus Lake area	Moses, P.	1999	Pr, Samp	2.19429	42D16/NE
Coldwell Township	Mogan, J.	1999	DD	2.19726	42D15/SE
Conacher and Hagey townships	Consolidated North Coast Ind. Ltd.	1998	GL, Str, Tr	2.18776	52B09/NE
Conacher Township	Calvert, D.	1998	DD, Samp	2.18928	52B09/SE
Conacher Township	Calvert, D.	1998-99	Pr, Samp	2.19386	52B09/NE
Conacher Township	Traverse, A.	1998	Pr, Samp	2.18847	52B09/NE
Connec Township	Sutton, E. & K.	1997	Pr, Samp	OP97-164	52A05/NE
Corrigal Township and Vert Island area	MacAlpine, D.	1998-99	Str	2.19461	52A16/NE
Crooks Township	Falconbridge Ltd.	1998	GM, Lc	2.18950	52A04/SE
Crooks Township	Falconbridge Ltd.	1998	IP	2.18976	52A04/SE
Crooks Township	Falconbridge Ltd.	1998-99	DD, Samp	2.19460	52A04/SE
Dawson Road Lots	Battle Mountain Canada Ltd.	1997-98	GL, Pr, Tr, Samp	2.19067	52A12/SW
Dawson Road Lots	Kukkee, K.	1997	Samp	2.19137	52A12/SW
Dawson Road Lots	Kukkee, K.	1997	Pr, Samp	2.19139	52A12/SW
Dawson Road Lots	Kukkee, K.	1997	Pr, Samp	2.19140	52A12/SE
Dawson Road Lots	Martin, J.	1998-99	GL, Str, Samp	2.19287	52A12/SW
Dawson Road Lots and Home Township	Kukkee, T.	1998-99	GEM, GM	2.19696	52A12/SW
Devon Township	North Atlantic Nickel Corp.	1999	DD, Samp	2.19660	52A04/SE
Dorion Township	Petrunka, D.	1998	Str, Tr, Samp	2.19068	52A15/SW
Duckworth Township	Jet Mining Expl. Inc.	1997	GL, Pr	2.18589	52B09/SE
Duckworth Township	Jet Mining Expl. Inc.	1998	GEM, GM, Lc	2.18458	52B09/SE
Duckworth Township	Jet Mining Expl. Inc. and Walsten, D.	1998-99	Str	2.19343	52B09/SE
Duckworth Township	Jet Mining Expl. Inc. and Walsten, D.	1999	GL	2.19533	52B09/SE
Finlayson and Steep	Fenwick, K.	1997	GL, Pr, Samp	OP97-210	52B13/SE

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Rock lakes					
Garden Lake area	Stares, S. & M.	1997	Pr, Samp	2.19124	52H12/SW
Garden Lake area	Stares, S. & M.	1998	Pr, Samp	2.19125	52H12/SW
Goodchild Lake area	Moses, P.	1997	GC, GL, Pr, Samp	OP97-205	42D16/NE
Hagey Township	Fogen, M.	1997	DD, Samp	OP97-268	52B09/NE
Haines and Hagey townships	Parker, D.	1998-99	GC, GL, GM, Pr, Samp	2.19291	52B09/NE
Haines Township	Petrunka, D.	1998	GEM, GM	2.18737	52B09/NW
Heaven Lake area	Fenwick, K.	1997	Pr, Samp	OP97-210	52H05/SE
Heaven Lake area	Twomey, T.	1997	GC, GL, Pr, Samp	OP97-234	52H05/SE
Herrick Lake area	Halverson, L.	1997	Pr, Str, Samp	OP97-232	42C12/SW
Horne Township and Dawson Road Lots	Kukkee, T.	1998	GEM, GM	2.18682	52A12/SW
Horne Township and Dawson Road Lots	Kukkee, T.	1998	Pr	2.18624	52A12/SW
Hutchinson Township	Wicheruk, M.	1998	Pr, Samp	2.19479	52B14/SW
Jean Township	Fontaine, M.	1997	Str	2.18768	52B08/SE
Kashabowie Lake area	Allegheny Mines Corp.	1998	IP	2.18816	52B09/NW
Kashabowie Lake area	Kukkee, K.	1997	Pr, Samp	OP97-022	52B09/NW
Kashabowie Lake area	Wing Res. Inc.	1998	GL, Tr, Samp	2.18887	52B09/NW
Laurie Township	Canadian Nickel Co. Ltd.	1996	DD, Str, Samp	2.18829	52A12/SW
Laurie Township	Hackl, J. & J.	1997	DD, Samp	2.19152	52A12/SW
Leckie Lake area	Fairservice, R.	1997-98	GL, GM, Tr, Samp, Thin Section	2.19142	52H02/SW
Lecours Township	Battle Mountain Canada Ltd.	1998	DD, Samp	2.19106	42C12/NW
Lecours Township	Homestake Canada Inc.	1996	GC, GL, Samp	2.18812	42D09/NE
Lecours Township and Rous Lake	Homestake Canada Inc.	1997	DD, Samp	2.19252	42D09/SE
Little Sturge Lake area	Dmitrovic, D.	1998-99	GC, GL, GEM, GM	2.19656	52G03/SW

THUNDER BAY SOUTH DISTRICT—1999

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
MacGregor Township	Grieve, M.	1996-97	DD, Str, Tr	2.18846	52A10/SW
MacGregor Township	Sergeant, D.	1998	GL	2.19154	52A11/SE
MacGregor Township	Sergeant, D.	1998	Str	2.19151	52A06/NE
MacGregor Township	Smith, B.A.	1998	Tr	2.19107	52A11/SE
Marks Township	Kukkee, R.A.	1998-99	Pr, Samp	2.19510	52A05/SW
Marks Township	Middaugh, R.	1997-98	Pr, Samp	2.18460	52A05/NW
Max Lake area	Christianson, S.	1997	Pr, Str, Samp	OP97-245	52H03/NW
Max Lake area	Gilbert, W.	1998	DD	2.19218	52H03/NW
Max Lake area	Gillis, D.	1997	DD, Pr, Str, Tr, Samp	2.19011	52H03/NW
McAlpine Lake area	Sergeant, D.	1997	GC, GEM, GM, GL	OP97-279	52B12/NE
McTavish Township	Bak, D.	1998	Str	2.19387	52A10/NE
Miranda Lake and Freeborn Township	888726 Ontario Inc.	1997	GEM, GM, Pr, Str, Lc, Samp	2.18866	52B13/SW
Moss Lake area	Ternowesky, J.	1998	GL, Pr, Samp	2.19134	52B10/SE
Moss Township	Ternowesky, J.	1998	GL, Pr, Samp	2.18930	52B10/SE
Moss Township	Ternowesky, J.	1998-99	DD, Samp	2.19135	52B10/SE
Moss Township	Ternowesky, J.	1998-99	DD, Samp	2.19286	52B10/SE
Moss Township and Powell Lake area	Pele Mountain Res. Inc.	1997	DD, Samp	2.18952	52B10/SW
Norway and Richardson lakes	Atikokan Res. Inc.	1996-98	GC	2.19112	52G03/SW
Norway Lake area	Atikokan Res. Inc.	1998	IP	2.19091	52G03/SW
Olie and Thomas lakes area	Gionet, G.	1997-98	DD, Str, Beep	2.18695	42F05/NE
Orbit and Senga lakes area	Lac des Iles Mines Ltd.	1998	Str	2.18577	52A13/NW
Orbit and Senga lakes area	Lac des Iles Mines Ltd.	1998-99	Str, Samp	2.19541	52A13/NW
Pardee Township	Luski, M.	1996-98	Pr, Str, Samp	2.19498	52A04/SE
Pardee Township	Sutton, E.	1997	Pr	OP97-164	52A04/SE
Pic Township	Michano, D.	1998	DD	2.18951	42D09/NE
Pic Township	Michano, D. & J.	1999	GC	2.19701	42D09/NE

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Pic Township	Michano, D. and Wahl, R.	1998	DD	2.19153	42D09/NW
Pic Township	Teck Corporation	1997	DD, Samp	2.19129	42D09/NW
Pic Township	Teck Corporation	1998	DD	2.19126	42D09/NW
Pic Township	Wahl, R.	1997	GL, DD, Samp	2.18929	42D09/NW
Powell Lake area	Koivisto, R.	1997	Pr, Str, Samp	OP97-244	52B07/NW
Powell Lake area	Kwiatkowski, R.	1998	Tr, Samp	2.19219	52B07/NW
Powell Lake area	Petrunka, D.	1997	Pr, Samp	OP97-073	52B07/NW
Priske Township	Daniels, G.	1998	Str, Samp	2.18977	42D14/SE
Priske Township	Jean, M.	1998	Tr	2.18843	42D14/SE
Puddy Lake area	Convey, G.	1997	Pr, Str, Samp, Blasting	2.19222	52H13/NE
Puddy Lake area	Obongo Precious Metals	1996	DD, Samp	2.18465	52H13/NE
Ramsay Wright Township	Fenwick, K.	1997	Pr, Samp	OP97-210	52B14/NW
Redhorse Lake area	Murgor Res. Inc.	1997	Pr, Samp	2.19215	52C08/NW
Richardson Lake area	Douglas, A.	1997	Pr, Samp	OP97-124	52G03/SE
Richardson Lake area	Fenwick, K.	1997	Pr, Str, Samp	OP97-210	52G03/SE
Saganagons Lake	International Capri Res. Ltd.	1999	DD	2.19389	52B07/SW
Sawbill Bay and Finlayson Lake area	Pentland Firth Ventures Ltd.	1997	Pr, Samp	2.19077	52B14/NW
Sawbill Bay and Finlayson Lake area	Pentland Firth Ventures Ltd.	1997-98	DD, Tr, Samp	2.19110	52B14/NW
Sawbill Bay area	Pentland Firth Ventures Ltd.	1996	GL, Tr, Lc, Samp	2.18717	52B14/NW
Seeley Lake and Pic Township	Michano, D. and Wahl, R.	1998	GC, GL, IP, Samp	2.19527	42D16/SW
Seeley Lake area	Joa, M.	1997	DD, Samp	2.18735	42D16/SW
Seeley Lake area	Joa, M.	1999	GEM, GM	2.19736	42D16/SW
Senga Lake area	Lac des Iles Mines Ltd.	1998	GC, GM, IP, Str	2.18945	52H04/SW
Smiley Lake area	Lockyer, C.	1997-98	Pr, Str, Tr, Samp	2.18944	52A14/NW
Steepprock Lake area	Twomey, T.	1997-98	GC, GEM, GM, GL, Samp	2.19290	52B13/SE
Syine Township	Daniels, G.	1998	GL, Str, Samp	2.18779	42D15/SW

THUNDER BAY SOUTH DISTRICT—1999

Township or Area	Company Name	Year	Type of Work	AFRO Number	Resident Geologist Office File Designation
Syrie Township	Daniels, G., Ferguson, J. & A.	1999	GM	2.19384	42D15/SW
Tib and Armistice lakes	Huston Lake Mining Inc., Obongo Precious Metals Inc.	1999	GEM, GM, DD	2.19525	52H04/NW, 52H05/SW
Tib Lake area	Obongo Precious Metals Inc.	1998	GL, Samp	2.18679	52H04/NW
Tib Lake area	Obongo Precious Metals Inc.	1998	Str, Samp	2.18680	52H04/NW
Tib Lake area	Richmond, W.J.	1999	GM	2.19449	52H04/NW
Tilly Lake area	Bumbu, C.	1999	Str	2.19463	52B10/NW
Tilly Lake area	Kwiatkowski, R.	1998	Tr, Samp	2.19220	52B10/SW
Tuuri and Walsh townships	Major General Res. Ltd.	1998	GL, Pr, Str, Samp	2.19251	42D15/SW
Tuuri and Walsh townships	Michano, D.	1998	GM	2.19284	42D15/SE
Tuuri Township	Michano, D.	1998	GM, Lc	2.18865	42D15/SW
Tuuri Township	Tremblay, M.	1998	GL, Pr, Tr, Samp	2.19341	42D15/SW
Upper Aguasabon Lake area	Tremblay, M.A.	1997	Pr, Samp	OP97-123	42E03/SE
Wabikoba Lake area	Superior Prospects Inc.	1999	GL, Str, Samp	2.19722	42C13/SW
Wabikon Lake area	Wagg, C.	1998	GEM, GM, Samp	2.19070	52H06/SW
Walsh Township	McCullough, D.	1997	GC, GEM, Pr, Samp, Beep	OP97-148	42D15/SE
Weaver Township	Morehouse, W.	1998	DD, Samp	2.18809	52B14/SE
Weaver Township	Morehouse, W.	1999	DD	2.19666	52B14/SE
White Lake North area	Battle Mountain Canada Ltd.	1997-98	GL, Pr, Str, Samp	2.18840	42C13/SE
White Lake North area	Battle Mountain Canada Ltd.	1998	DD, Samp	2.19939	42C13/SE
White Lake North area	Prophet Minerals Corporation	1996	GL, Lc, Samp	2.18630	42C13/SE

Table 3. Exploration activity in the Thunder Bay South District in 1999.

Abbreviations	
AEM	Airborne electromagnetic survey
AM	Airborne magnetic survey
ARA	Airborne radiometric survey
Beep	Beep Mat survey
Bulk	Bulk sampling
DD	Diamond drilling
DDH	Diamond drill hole(s)
DGP	Down-hole geophysics
EnvR	Environmental Baseline Study
GC	Geochemical survey
GEM	Ground electromagnetic survey
GL	Geological Survey
GM	Ground magnetic survey
GRA	Ground radiometric survey
Grav	Gravity survey
HLEM	Horizontal loop electromagnetic survey
HM	Heavy mineral sampling
IM	Industrial mineral testing and marketing
IP	Induced polarization survey
Lc	Linecutting
Met	Metallurgical testing
OD	Overburden drilling
ODH	Overburden drill hole(s)
OPAP	Ontario Prospectors Assistance Program
PEM	Pulse electromagnetic survey
PGM	Platinum group metals
Pr	Prospecting
RES	Resistivity survey
Samp	Sampling (other than bulk)
Seismic	Seismic survey
SP	Self-potential survey
Str	Stripping
Tr	Trenching
UG	Underground exploration/development
VLEM	Vertical loop electromagnetic survey
VLFEM	Very low frequency electromagnetic survey

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
1.	Atkins, W. (Atikokan Property)	McAlpine Lake area (PGE)	Pr, Samp, Str (OPAP)
2.	Atikokan Resources Inc. (Herontrack Lake Property)	Norway Lake area (Ag, Cu, Zn, Pb)	DD, IP, DGP
3.	Avalon Ventures Ltd. / East West Resource Corporation / Canadian Golden Dragon Resources Ltd. (Disraeli Property)	Leckie Lake area (PGE)	GL, Samp
4.	Avalon Ventures Ltd. / East West Resource Corporation / Canadian Golden Dragon Resources Ltd. (Seagull Property)	Leckie Lake area (PGE)	GL, Samp
5.	Band-Ore Resources Ltd. (Nym Lake Property)	Pickereel Lake North area (PGE)	Pr, Samp, DD
6.	Band-Ore Resources Ltd. (Q-9 Property)	Saganagons Lake area (Au)	DD
7.	Battle Mountain Canada Ltd. (Golden Giant Mine)	Bornby Tp. (Au)	DD, UG
8.	Battle Mountain Canada Ltd. (Golden Sceptre Property)	Bornby & Lecours tps. (Au)	Reconnaissance GL, Pr, Samp, GC
9.	Battle Mountain Canada Ltd (Page Lake Property)	Lorna Lake area (Au)	Reconnaissance GL, Pr, Samp, GC

THUNDER BAY SOUTH DISTRICT—1999

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
10.	Battle Mountain Canada Ltd (Page Lake South Property)	Lorna Lake area (Au)	Reconnaissance GL, Pr, Samp, GC
11.	Battle Mountain Canada Ltd. (Pelangio Property)	Lorna Lake area (Au)	Reconnaissance GL, Pr, Samp, GC
12.	Battle Mountain Canada Ltd (Valley Property)	Wabikoba Lake area (Au)	Reconnaissance GL, Pr, Samp, GC
13.	Battle Mountain Canada Ltd. (Walton Property)	Bomby Tp. (Au)	Reconnaissance GL, Pr, Samp, GC
14.	Battle Mountain Canada Ltd. (White River Property)	Oskabukuta Lake area (Au)	Reconnaissance GL, Pr, Samp, GC
15.	Battle Mountain Canada Ltd. (West White River Property)	McCron Tp. (Au)	Reconnaissance GL, Pr, Samp, GC
16.	Battle Mountain Canada Ltd. / Aavdex Corporation (Wire Lake Property)	Lorna Lake area (Au)	Reconnaissance GL, Pr, Samp, GC
17.	Bjorkman, K. (Miranda Lake Property)	Baker Tp.(Au)	Pr, Samp (OPAP)
18.	Bumbu, C. (Bylund Property)	Dawson Road Lots (Au)	GM, GEM
19.	Calvert, D. & D. (Shelter Bay Property)	Conacher Tp (Au)	Pr, Samp, GM, GEM (OPAP)
20.	Cameco Gold Inc. (Daniels Property)	Syine Tp.(Au)	Lc
21.	Cameco Gold Inc. (Empress East Property)	Syine Tp.(Au)	Str, GL, Samp
22.	Canadian Golden Dragon Resources Ltd. (Ottertooth Property)	Obonga Lake are (PGE)	GL, Samp
23.	Chataway, B., Swire, R., Middaugh, R. & McIsaac, J. (Adrian Base Metal Property)	Adrian Tp. (Cu, Zn)	GL, VLF-EM, VLEM, HLEM, Lc, GM, GEM, Soil GC, Pr, Samp (OPAP)
24.	Christianson, D. & Neely, P. (Puddy - Awkward Property)	Puddy Lake area (PGE)	Pr, Samp (OPAP)
25.	Canadian Golden Dragon Resources Ltd. / Colby Resources Corp. (Grand Bay Property)	Grand Bay (Lake Nipigon) area (PGE, Ni)	GL
26.	Colby Resources Corp. / Prism Resources Inc. / East West Resource Corporation (Plateau Lake Property)	McAlpine Lake area (PGE)	IP, GM
27.	Colby Resources Corp. / East West Resource Corporation (Posh Property)	Wabikon Lake area (PGE)	Pr, GL, Samp

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
28.	DeCarle, R. (Northern Light Property)	Titmarsh Lake area (Cu, Zn)	Samp, Pr, Tr (OPAP)
29.	Donnybrook Resources Inc./ Starcore Resources Ltd. (Abiwin Property)	Trottier Tp. (PGE)	Pr, GL, Lc, GM
30.	Duess, R. & Durham, B. (Atikokan Project)	Crooked Pine Lake area (PGE)	Samp, Pr, Tr (OPAP)
31.	Dumont Nickel Inc. (Blake Project)	Blake Tp. (Cu, Ni, PGE)	AM, AEM, DD
32.	East West Resource Corporation / Canadian Golden Dragon Resources Ltd. (Hele Property)	Hele Tp. (PGE)	Pr, GL, Samp
33.	East West Resource Corporation / Canadian Golden Dragon Resources Ltd. (McIvor Property)	McIvor Tp. (PGE)	Pr, GL, Samp
34.	Eveleigh, A. & Gagne, P. (Burnt Island Property)	Bedivere Lake area (PGE)	GL, Pr, Samp, DD, Tr (OPAP)
35.	Falconbridge Limited (Pigeon River Property)	Pardee & Crooks Tps. (Cu, Ni, PGE)	IP, AM, AEM, DD
36.	Fenwick, K. (Legris Lake Property)	Lac des Iles, Max Lake, Shelby Lake, Whitefin Lake areas (PGE, Cu, Ni)	Pr, Samp (OPAP)
37.	Fort Knox Gold Resources Inc. / Indo Metals Ltd. (Chief Peter Lake Property)	Bedivere Lake area (PGE)	GL, Pr
38.	Fort Knox Gold Resources Inc. / Indo Metals Ltd. (Kawene Property)	Trottier Tp. (PGE)	GL, Pr
39.	Fort Knox Gold Resources Inc. / Indo Metals Ltd. (Kawene South Property)	Eva Lake area (PGE)	Pr, GM
40.	Fort Knox Gold Resources Inc. / Indo Metals Ltd. (East Dog River Property)	Senga Lake area (PGE)	Pr, GL
41.	Fowler, B. (Superior Prospects Inc.) (Petrant Lake Property)	Wabikoba Lake area (Au)	Pr, Samp, Str (OPAP)
42.	Franco-Nevada Mining Corporation (Hemlo Project)	Bomby Tp. (Au)	UG, DD, Samp
43.	Freewest Resources Canada Inc. / Greater Lenora Resources Corporation (Bylund Property)	Dawson Road Lots & Goldie Tp. (Au)	DD
44.	Gilbert, W. & Gillis, D. (Block Creek Property)	Whitefin Lake & Max Lake areas (Cu, Ni, PGE)	Pr, Samp, Tr

THUNDER BAY SOUTH DISTRICT—1999

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
45.	Gionet, B. & Michano, D. (Black Fox Lake Property)	Tuuri Tp. (Au)	Pr, Samp, Str, Tr (OPAP)
46.	Gionet, G. & M. (Ice Cream Lake Property)	Herbert & Roberta tps. (Cu, Ni, PGE)	Pr, Samp, Str, Tr
47.	Gryphon Metals Corporation (Bulldozer Lake Property)	Shabotik River area (PGE, Cu, Ni)	Lc, GM, VLF-EM, Pr, Samp
48.	Hackl, J. & J. (Haines Gabbro Property)	Haines & Hagey tps. (Cu, Ni, PGE)	Str, Pr, Samp (OPAP)
49.	Hietapakka, R. (Crystal Creek Property)	Tartan Lake area (amy)	Str, Pr
50.	Home Ventures Ltd. / Richmond, W. & Morehouse, W. (Buck Lake Property)	Tib Lake area (PGE, Cu, Ni)	Lc, GM
51.	Houston Lake Mining Inc. / Obongo Precious Metals (Puddy Lake Property)	Puddy Lake area (PGE, Cu, Ni)	Lc, GM, Str, Samp, Pr, GEM, GM
52.	Houston Lake Mining Inc. / Obongo Precious Metals Inc. (Tib Lake Property)	Tib Lake area (Cu, Ni, PGE)	LC, IP, DD, GL, Str
53.	International Capri Resources Ltd. / TNK Resources Inc. (Wolf Lake Property)	Saganagons Lake area (Au)	DD
54.	International Taurus Resources Inc. (North Shores Property)	Priske Tp. (Au)	Comp
55.	Jet Mining & Exploration / Walsten, D./ Wing Resources Inc. / Landore Resources Inc. (Goldcreek Property)	Duckworth Tp. (Au, Cu, Zn)	Str, GL, Samp
56.	Kukkee, E. & Kwiatkowski, R. (Elephant Lake Property)	Tilly Lake area (Au)	Pr, Samp, Str
57.	Kukkee, K. & Koivisto, R. (Powell Lake Property)	Powell Lake Area (Au)	Pr, Samp, Str (OPAP)
58.	Kukkee, R. (Boreal Property)	Aldina & Sackville tps. (Au)	Pr, Samp, Str (OPAP)
59.	Kukkee, T. (Shabaqua "Caldera" Property)	Home Tp. & Dawson Road Lots (Au)	Str, Pr
60.	Lac des Iles Mines Ltd (Buck Lake Property)	Tib Lake area (PGE, Cu, Ni)	Pr, Samp
61.	Lac des Iles Mines Ltd (Chief Bay Property)	Chief Bay & Lunch Creek areas (PGE, Cu, Ni)	Pr, Samp
62.	Lac des Iles Mines Ltd. (Lac des Iles Mine Property)	Lac des Iles area (PGE, Cu, Ni)	DD, Samp, Pr, Str, GL

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
63.	Lac des Iles Mines Ltd (Tib Lake Property)	Tib Lake area (PGE, Cu, Ni)	Str, Pr, Samp
64.	Lac des Iles Mines Ltd. (Wakino Lake Property)	Orbit Lake & Senga Lake areas (PGE, Cu, Ni)	Pr, Samp
65.	Landis Mining Corporation (Fountain Lake Property)	Moss Tp. (Au)	DD
66.	L.E.H. Ventures Ltd. (Geordie Lake Property)	Seeley Lake area (PGE)	DD, Pr, Samp
67.	MacAlpine, D. / Ruby Lake Marble Ltd. (Ruby Lake Marble property)	Corrigan Tp. (Stone)	Str, IM
68.	Major General Resources Ltd. / Atma Resources Ltd. (Spider Lake Property)	Tuuri & Walsh tps. (Cu, Zn, Au)	Lc, Pr, Samp, PEM, IP
69.	Martin, J. & Fogen, M. (Kashabowie Property)	Kashabowie area (Au)	Pr, Samp Str, Tr, GL (OPAP)
70.	Mealey, L. & B., & Spence, I. (Tyko Lake Property)	McGill Tp. (PGE, Cu, Ni)	Pr, Samp (OPAP)
71.	Michano, G. (Bews Lake Property)	Strey Tp. (Au, Cu, Zn)	Pr, Samp (OPAP)
72.	Michano, D. (Smoke Lake Property)	Lorna Lake area (Au, Cu, Zn)	Pr, Samp (OPAP)
73.	Middaugh, R. (Adrian Property)	Adrian Tp. (Au)	Pr, Samp, Lc, Soil GC, GM, VLF-EM, GEM (OPAP)
74.	Middaugh, R. (McQuaig-Pardee Property)	Pardee Tp. (Cu, Ni, PGE)	Pr, GI, GEM
75.	Morgan, J. (Coldwell Property)	Coldwell Tp. (stone)	DD, Samp
76.	Moses, P. & Gionet, B. (Goodchild Lake Property)	Lorna Lake Area (Au)	Pr, Samp, Str (OPAP)
77.	Moss Lake Gold Mines Ltd. (Fountain Lake Property)	Moss Tp. (Au)	GL
78.	Nelson, B. (Miranda Lake Property)	Baker Tp. (Au)	Pr, Samp (OPAP)
79.	Noranda Mining and Exploration Inc. (Willroy - Synform Property)	Mapledoram Tp. (Cu, Zn)	DD, PEM
80.	Noranda Mining and Exploration Inc. (Rawluk Lake Property)	Cecil Tp. (Cu, Zn, Ni)	DD, Lc, GEM
81.	North Atlantic Nickel Corp. (Blake Project)	Blake Tp. (Cu, Ni, PGE)	DD

THUNDER BAY SOUTH DISTRICT—1999

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
82.	Patricia Mines Inc. (Lac des Îles Property)	Lac des Îles area (PGE)	GL, Pr, Samp
83.	Pele Mountain Resources Inc. (Moss / Ardeen Mine Property)	Moss Tp. (Au)	GL, Comp
84.	Pinksen, J. & Varrin, R. (Boot Bay Property)	Boot Bay area (Cu, Ni, PGE)	Pr, Samp (OPAP)
85.	Pitkanen, R. & D. (Gorham - Lakehead Property)	Gorham Tp. (Au)	Pr, Samp (OPAP)
86.	Renner, R. (Smoke Lake Property)	Lorna Lake area (Au)	Pr, Samp, Str (OPAP)
87.	Richmond, W. (Buck Lake Property)	Dog River and Tib Lake areas (Cu, Zn, Ni)	Pr, Samp, Str (OPAP)
88.	RJK Explorations Ltd. / Greater Lenora Resources Corp. (Garden Lake Property)	Garden Lake area (Au)	DD, Pr, Samp
89.	RJK Explorations Ltd. / Greater Lenora Resources Corp. (Goldie Property)	Dawson Road Lots, Goldie Tp. (Au)	DD
90.	RJK Explorations Ltd. / Greater Lenora Resources Corp. (Rockstone Lake Property)	Adrian Tp. (Au, Cu, Zn)	Lc, GEM, Pr, DD
91.	RJK Explorations Ltd. / Greater Lenora Resources Corp. (Stares Property)	Aldina Tp. (Au, Cu, Zn)	Str, Tr, Pr, Samp, IP
92.	Schultz, J. (Schultz Property)	Dawson Road Lots (Au)	Pr, Samp
93.	Starcore Resources Ltd. (Mud Lake Property)	Trotter Tp. (PGE)	Pr, Samp, GL
94.	Starcore Resources Ltd. / ProAm Explorations Corporation (Samuels Lake Property)	Factor Lake and Beaverhouse Lake areas (PGE)	DD, GM, HLEM, Tr, DGP (PEM), GL, Samp
95.	Stares, M. & S. (Goldie Property)	Goldie Tp. (Au)	Pr, Samp (OPAP)
96.	Stares, M. & S., & Dawson, J. (Stawson Property)	McOuat Lake area (PGE)	Pr, Samp
97.	Stewart, M. (Tinto Lake Property)	Lamport Tp. (Au, Cu, Zn)	Pr, Samp
98.	Stewart, M. (Jade Lake Property)	Weikwabinonaw Lake area (Au, Cu, Zn)	Pr, Samp
99.	Tandem Resources Ltd. (Tilly Creek Property)	Moss Tp. (Au)	DD, Lc, GEM, GM

No	Company/Individual (Occurrence Name) or Property	Township/Area (Commodity)	Exploration Activity
100.	Teck-Corona Operating Corporation (David Bell Mine)	Bomby Tp. (Au)	DD, UG
101.	Teck Corporation (Heron Bay Property)	Pic Tp. (Au)	DD
102.	Teck Corporation (White River Property)	Laberge, Brothers tps. (Au)	GL, Samp
103.	Twomey, T. (Atikokan Property)	Schwenger Tp. (Au)	Pr, Samp (OPAP)
104.	Viitala, R. & Irwin, J. (Crooks Property)	Crooks Tp. (Cu, Ni, PGE)	Pr, Samp
105.	Viitala, R. & Luski, M. (Pardee Property)	Pardee Tp. (Cu, Ni, PGE)	Pr, Samp
106.	Wahl, R. (Pic River Property)	Pic Tp. (Au)	Pr, Tr, Samp
107.	Wahl, R. (Budall Lake Property)	Loma Lake & Cirrus lake areas (Au)	Pr, Samp
108.	Wahl, R. (Heron Bay Property)	Pic Tp. (Au)	Pr, Samp
109.	Wahl, R. & Daniels, G. (Lunch Lake Property)	Syine Tp. (Au)	Pr, Samp, Str (OPAP)
110.	Wallenius, B. & W. (Arrow River Property)	Devon Tp. (PGE, Cu, Ni)	Pr, Samp
111.	Williams Operating Corporation (Williams Mine)	Bomby Tp. (Au)	DD, UG
112.	Wilson, G, Harper, G. & Manns, F. (Onion Lake Project)	Onion Lake & Tartan Lake areas (Cu, Ni, PGE)	Pr, Samp (OPAP)
113.	Wing, A. (Blackwell Property)	Blackwell Tp. (Au)	Pr, Samp (OPAP)

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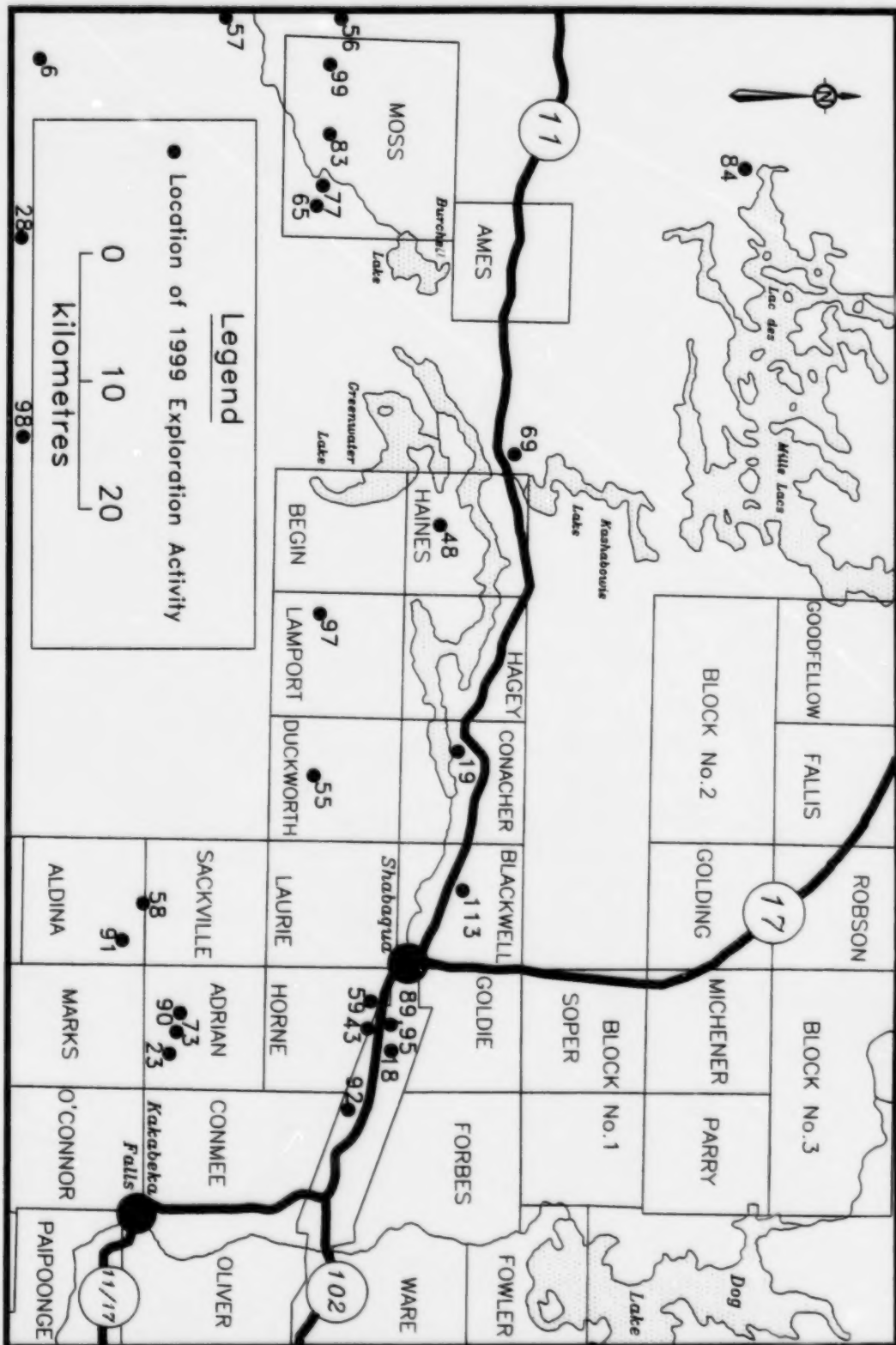


Figure 1b. Thunder Bay South District (Shebandowan area) Exploration Activity, 1999.

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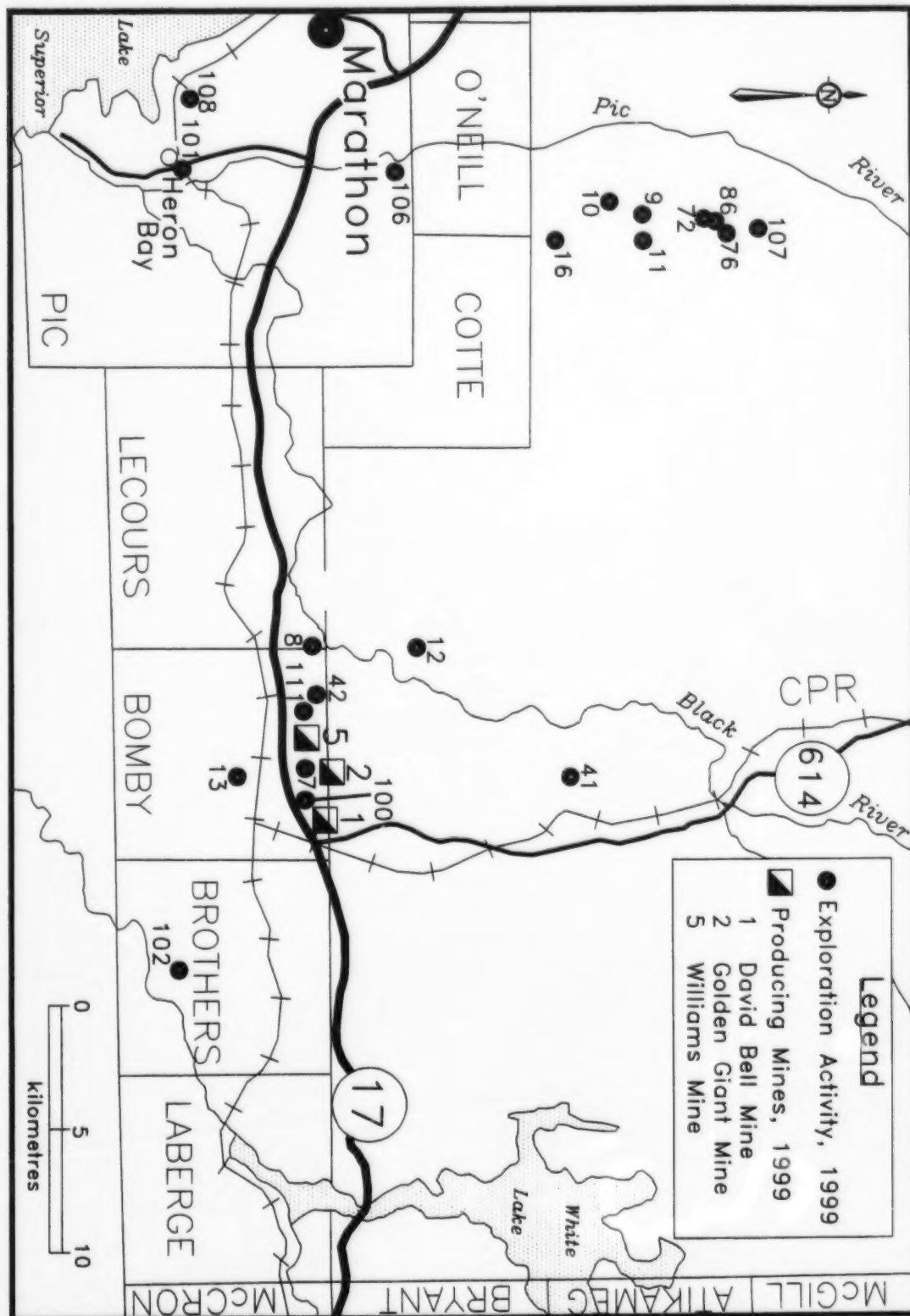


Figure 2b. Thunder Bay South District (Hemlo area) Exploration Activity, 1999.

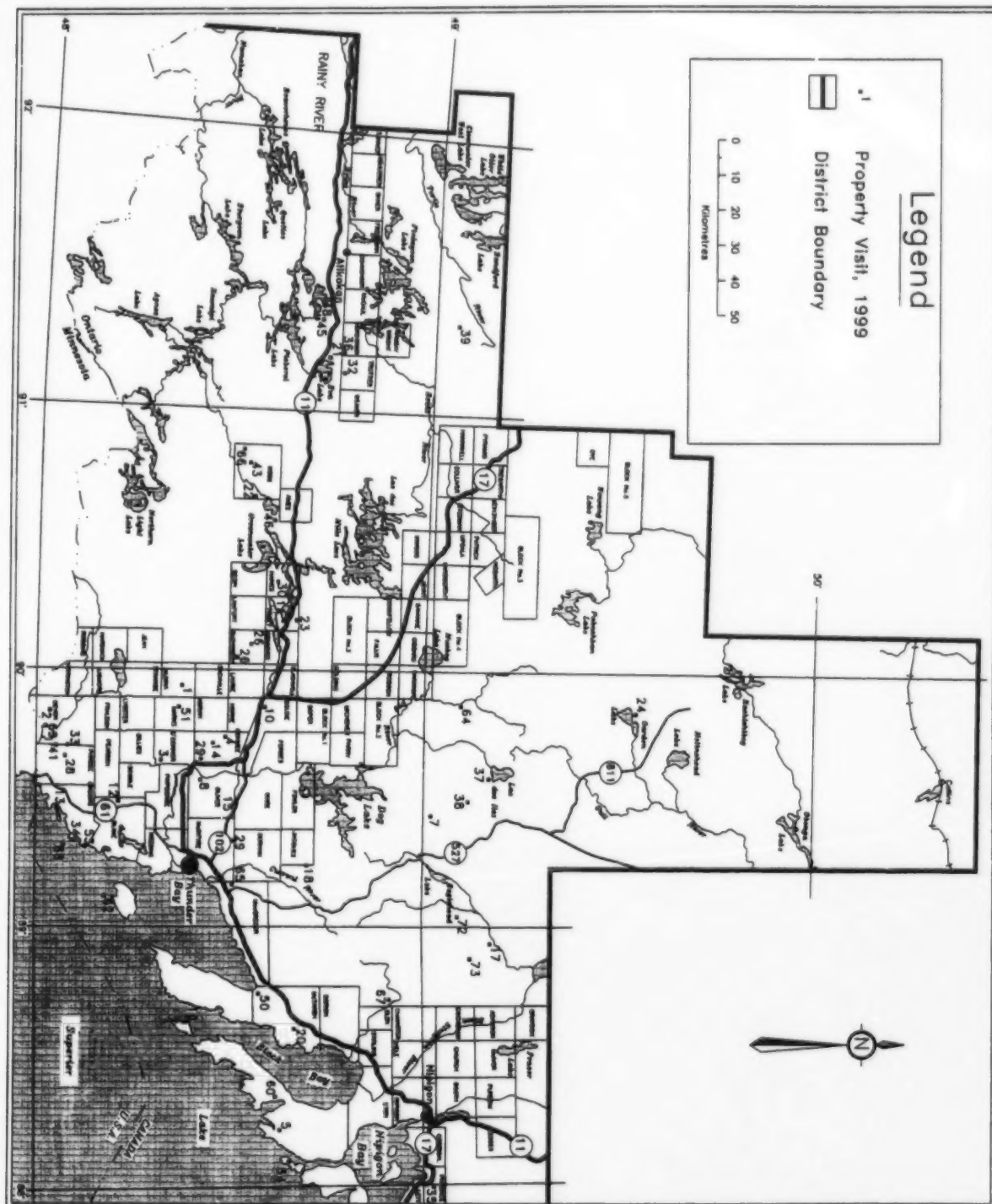


Figure 3a. Thunder Bay South District (western portion), Property Visits, 1999.

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LAND USE PLANNING ACTIVITY

Staff of the Thunder Bay South District were involved with many aspects of the *Ontario's Living Legacy* initiative in 1999, including preparing mineral resource assessments for designated and candidate provincial parks and conservation reserves. Several municipal plans and forest management plans were also reviewed. M.C. Smyk represented the Northwestern Ontario Prospectors Association on the Regional Committee for the proposed National Marine Conservation Area (NMCA) in western Lake Superior.

RESIDENT GEOLOGIST PROGRAM STAFF AND ACTIVITIES

The Thunder Bay South district is staffed by B. R. Schnieders, Regional Resident Geologist, J.F. Scott and M.C. Smyk, District Geologists, and A. Lichtblau, District Support Geologist. A. Walden left her position as District Support Geologist in 1999. During 1999, the Thunder Bay South program dealt with more than 4000 inquiries from the mining sector, other government agencies, and the general public. Bi-weekly visits were made to the Marathon satellite office from May until October, usually on Tuesday afternoons. Service was also provided to clients in the Thunder Bay Drill Core Library, as well as the remote core storage facilities in Conmee Township (30 km west of Thunder Bay) and in Marathon.

Staff of the Thunder Bay District completed 90 visits to 74 properties in 1999 (Table 4, Figures 3a,b). Twelve field trips were conducted or attended. Four poster displays were assembled and manned at the Northwestern Ontario Mines and Minerals Symposium in Thunder Bay, the Prospectors and Developers Association of Canada convention in Toronto, and at other various open houses and conferences. Nine technical presentations were delivered. Logistical support and field assistance were given to both Ontario Geological Survey and Geological Survey of Canada geoscientists conducting field work in the Thunder Bay South District.

Staff of the Thunder Bay South Resident Geologist's Office and R. Tuomi, Data Compilation Geologist, Thunder Bay, edited over 200 Mineral Deposit Inventory (MDI) records in 1999. This included fixing errors created during the MDI1-MDI2 data conversion; adding and deepening the data for past producing and producing mines; and entering data from Open File Report 5539, *Property Visits and Reports of the Atikokan Economic Geologist, 1979-1983*. Seven new records were created; 68 records were deleted because they were empty data created by the conversion process.

M.C. Smyk served on the Goldich Medal Committee of the Institute on Lake Superior Geology (ILSG), on the organizing committee for the 46th ILSG meeting (2000), on the Regional Committee for the proposed Lake Superior National Marine Conservation Area (NMCA), and as a core member of the Pukaskwa National Park Regional Communication Group. J.F. Scott was actively involved in the application of Global Positioning System (GPS) technology (e.g. property, road, detailed grid, stripped area, and air photo base maps). B. R. Schnieders was a member of the Black Sturgeon 2001-2021 Forest Management Plan Planning Team, as well as a member of the Strengthening Ontario's Prospecting Community (SOPC) Committee.

Table 4. Property visits conducted by the Thunder Bay South Regional Resident Geologist and Staff in 1999

Number (keyed to Figures 3a,b)	Property/Occurrence
1.	Aldina
2.	Arrow River
3.	Beaver Mine
4.	Binabick Lake
5.	Black Bay Peninsula ^{PT}
6.	Black Fox Lake ^{PE}
7.	Block Creek
8.	Blueberry Amethyst ^{PT}

9.	Buildozer Lake ^{PE}
10.	Bylund (Dawson Road Lots)
11.	Cal-Chris
12.	Chaschuk
13.	Cloud Bay
14.	Conmee Twp. Limestone
15.	Dawson Road Lots (Bobyk)
16.	Dead Horse Creek Road ^{PT}
17.	Disraeli Lake
18.	East Dog Lake (Sunday Lake)
19.	Edward Island
20.	Enterprise Mine ^{PT}
21.	Eva Lake
22.	Fountain Lake
23.	Frank West
24.	Garden Lake ^R
25.	Geco Mine
26.	Gold Creek
27.	Goodchild Lake (Moses) ^{PE}
28.	Great Lakes Nickel ^{PT}
29.	Gunflint Formation (various) ^{PT}
30.	Haines Gabbro
31.	Heron Bay
32.	Heward Lake
33.	Isotalo
34.	Jarvis Point
35.	Kama Hill ^{PT}
36.	Kawene
37.	Lac des Iles Mine ^{PT}
38.	Legrís Lake
39.	Lumby Lake
40.	Lunch Lake
41.	McQuaig Float
42.	Morley Pyrite
43.	Moss Mine
44.	Mudge
45.	Nickleby Lake
46.	North Coldstream Mine
47.	North Shores Mine
48.	Nym Lake
49.	Oiseau Bay Reconnaissance
50.	Pass Lake ^{PT}
51.	Pete's Lake
52.	Petrant Lake
53.	Prince Location
54.	Puff Island
55.	Rabbitskin Lake
56.	Red Rock Cuesta ^{PT}
57.	Ruby Lake ^{PT}
58.	Schreiber Channel ^{PT}
59.	Shabotik ^{PE}
60.	Shesheeb Bay
61.	Smoke Lake

62.	Spar Island
63.	St. Ignace Island ^{PT}
64.	Taman Lake
65.	Thunder Bay Agate Mine ^{PT}
66.	Tilly Creek
67.	Venice Lake
68.	Victoria Island
69.	Wallenius
70.	Williams Mine ^{PT}
71.	Winston Lake Mine ^{PT}
72.	Wolatka Lake ^{PT}
73.	Wolf Mountain ^{PT}

^R described in RECOMMENDATIONS FOR EXPLORATION, this report

^{PE} described in PROPERTY EXAMINATIONS, this report

^{PT} visited during field trip conducted by Resident Geologist's staff in 1999

PROPERTY EXAMINATIONS

Black Fox Lake

Black Fox Lake is located approximately 20 km east of Terrace Bay, on the north side of Highway 17. It was the subject of an OPAP-funded prospecting program by B. Gionet in 1999. Although the area had long been considered prospective ground for gold mineralization because of ubiquitous deformation, alteration and (base metal-rich) sulphide mineral occurrences, few gold occurrences had been discovered. Silicified, carbonatized, green-mica-rich zones were discovered northeast of Black Fox Lake by D. Michano in 1994 (Schnieders and Smyk 1995). Prospecting and exploration in the area has also been spurred by recent work and base metal discoveries on the nearby Spider Lake property of Major General Resources Ltd. (Schnieders *et al.* 1999).

The property is underlain by deformed and altered supracrustal and intrusive rocks of the Schreiber-Hemlo greenstone belt, as mapped by Walker (1967). A series of parallel, east-northeast-trending, fault-bounded panels have been suggested by mapping. Black Fox Lake follows a prominent, east-northeast-trending structure. Much of the bedrock exposed along its shoreline is strongly foliated at approximately 60°. Medium- to coarse-grained, mafic to intermediate intrusive rocks predominate. They are in contact with fine-grained phyllites that were likely derived from wackes and siltstones. Enclaves of mafic metavolcanic rocks were also noted by Walker (1967). Prospecting, overburden stripping and sampling conducted in 1999 concentrated on strongly sheared and altered zones exposed at or near the lake's northern shoreline.

The main gold occurrence, which has returned up to 2.5 g/t Au in grab samples (B. Gionet, Prospector, personal communication, 1999) is hosted by a strongly sheared, fissile, intermediate intrusive rock that has been termed diorite. This deformed diorite is iron-carbonatized and crosscut by irregular, podiform and pygmatic, quartz-carbonate veins. One grab sample of a vein returned 1.0 g/t Au (*ibid.*). Approximately 10 m to the northeast, a 10 m-long trench in overburden has revealed flattened feldspar and quartz crystals and amphibole porphyroblasts in a fine-grained, mafic matrix. Anastomosing iron-carbonate veinlets and micaceous, schistose zones are common.

Approximately 25 m to the northeast, the host rock is completely replaced by a quartz - chlorite + green mica + iron-carbonate assemblage and contains $\leq 2\%$ finely disseminated pyrite. Away from this intensely altered zone, the rock is incipiently altered and resembles that exposed in the first trench. Pinkish-white, feldspathic dikes crosscut the diorite. The altered, pyritized zone returned 0.03 ounce per ton gold (*see table*). Similar gold values were returned from samples taken approximately 4 m offshore when the water level was lower (B. Gionet, Prospector, personal communication, 1999). These narrow, intensely altered,

auriferous zones may represent anastomosing or bifurcating shear zones that are related to a major structure that extends east-northeast, under Black Fox Lake. Silicified, iron-carbonatized, green mica-rich, altered zones persist several hundred metres along the shoreline to the northeast, where they have returned anomalous gold (approximately 95 ppb Au) and copper (approximately 850 ppm Cu) values (ibid).

Sample Number / Location	Sample Description	Au (oz/ton)
99 BGM -03 main showing (lakeshore point)	rusty-weathering, iron-carbonatized, silicified and sericitized dike(?), local green mica; disseminated, fine-grained pyrite $\leq 2\%$	0.01
99 BGM -04A bottom (lakeshore) end of trench; 25m northeast of main showing	sheared, dark green diorite(?) cut by quartz + iron-carbonate veins; sericitic; disseminated fine-grained pyrite $\leq 1\%$	0.03

The area surrounding Black Fox Lake has been favourably compared with gold deposits in the Kirkland Lake area (Schnieders and Smyk 1995). Similarities include the association of gold with large, regional structures and subordinate, splay structures, and green mica-iron-carbonate alteration. Recent prospecting activities have led to the discovery of additional, anomalous to low-grade (i.e. 100 to 2500 ppb Au) gold occurrences that are associated with structurally controlled alteration zones. Further prospecting and exploration is warranted based on these discoveries.

Moses (Goodchild Lake) and Smoke Lake Properties

The Moses (Goodchild Lake) property is located approximately 22 km northeast of Marathon, in the Schreiber-Hemlo greenstone belt. The area has been previously mapped by Milne (1967) and has been recommended for gold exploration Schnieders *et al.* (1988, 1992, 1993, 1996); Schnieders and Smyk (1989, 1990, 1994, 1995, 1997) and Friske *et al.* (1991a,b). The showing (GPS Coordinates 16U 5413857 northing, 0557117 easting) was discovered in the summer of 1997 by Peter Moses, with the assistance of an OPAP grant. Gold mineralization is related to a north-northwest-trending shear zone (346/60NE), within sheared, carbonatized and sulphidized, metavolcanic rocks. The mineralized, northeast- to east-striking metavolcanic rocks are bordered to the southwest by the Beggs Lake quartz monzonite stock and to the north by the Goodchild Lake serpentinite (Milne 1967).

Gold mineralization is associated with a sheared, carbonatized (ankerite and calcite) and sulphide-rich chlorite schist zone up to 1 m wide and 165 m long. The zone contains ≤ 5 to 7% disseminated and banded pyrite. A chip sample collected by the senior author assayed 0.06 ounce per ton gold across 0.45 m (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Grab samples collected by P. Moses have assayed as high as 8.6 g/t Au (P. Moses, Prospector, personal communication, 1998). On the northeast end of the system, massive, ankerite-tourmaline veins are present, developed parallel to the north-northwest-trending structure. In several areas, tourmaline veins have a stockwork appearance. At the southeast end of the structure, intensely foliated and crenulated, carbonate-rich, green-mica schist, containing disseminated pyrite, occurs. Folding is ubiquitous; a fold axis trending 310° and plunging 25° was measured in folded, chloritic, metavolcanic rocks. Further stripping and prospecting is warranted in all these areas.

Investigations by the authors in the Goodchild Lake and Beggs Lake areas (Schnieders *et al.*, 1996), have revealed numerous quartz-tourmaline vein systems. Milne (1967) described one such quartz stockwork, approximately 500 m northwest of the Moses (Goodchild) occurrence:

An interesting occurrence was observed about 1 mile west of Goodchild Lake and ¼ mile southeast of Cawanogami lake. An old claim post, Post No. 4, T.B. 44733, is about 50 to 60 feet south of the exposure. The metavolcanic rock at this location is cut by a 50-foot wide granite dike containing 5 to 10 percent disseminated pyrite. The metavolcanic country rock is highly carbonatized and also contains much disseminated pyrite. Both the carbonatized country rock and the granite dike are cut by a number of ¼ to 6-inch wide quartz-tourmaline veins. The granite is brecciated in part and

cemented by the same quartz-tourmaline material. Assay of a grab sample, taken by the author, of one of the tourmaline veins, indicated only a trace of gold; however, this location has never been examined in detail before and has sufficient merit to warrant further investigation.

The Smoke Lake area has been documented and recommended by Schnieders *et al.* (1988, 1992, 1993, 1996); Schnieders and Smyk (1989, 1990, 1994, 1995, 1997) and Friske *et al.* (1991a,b). Hemlo Gold Mines Inc. in 1993 discovered high grade, visible-gold bearing, quartz vein float boulders on the north shore of Smoke Lake (Thomson 1995; Schnieders *et al.* 1996). Prospecting activity was carried out by R. Renner, P. Moses and D. Michano on their Smoke Lake property in 1999. Overburden trenching, prospecting and sampling in the area of the float boulders failed to reach bedrock, but revealed abundant, angular quartz float boulders ≤ 60 cm long. Grab samples collected by the prospectors assayed up to 0.942 ounce per ton gold (R. Renner, Prospector, personal communication, 1999). Gold-bearing quartz veins, discovered approximately 150 m west of the Smoke Lake float occurrence by M. Smyk in 1996, assayed as high as 0.78 ounce per ton gold from grab samples (Schnieders and Smyk 1997).

Field investigations by the senior author in 1999, on the north shore of Smoke Lake, revealed numerous sulphide-rich zones hosted by mafic, chloritic schists. The metavolcanic rocks are foliated at 288/80N. Several sheared, cherty, siliceous zones, possibly representing "lean", banded iron formations, were observed. A float sample of mafic schist with $\leq 3\%$ sulphides assayed 0.02 ounce per ton gold, 528 ppm Cu and 8220 ppm Zn (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Sulphide zones in rusty, chloritic metavolcanic rocks on the north shore of Smoke Lake assayed up to 8611 ppb Zn (*ibid*). Prospecting by D. Michano on the east shore of Budall Lake led to the discovery of a banded iron formation that returned 1.92 % Zn, 0.28 % Cu and 55 ppb Au (D. Michano, Prospector, personal communication, 1999). Prospecting by the senior author on a small inlet creek on the northeast corner of Smoke Lake, revealed a highly carbonatized, fine-grained, metavolcanic float boulder with rare sulphide minerals, which assayed 0.05 ounce per ton gold (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Numerous quartz vein samples with abundant tourmaline were observed in the creek bed.

Prospecting by P. Moses and R. Renner approximately 500 m east-northeast of Smoke Lake, and between Smoke and Bond Lake led to the discovery of the "Beaver Pond Float". This angular, felsic intrusive float boulder returned 20 g/t Au (P. Moses, Prospector, personal communication, 1999). A sample of fine-grained, pink to red, altered syenite, with crosscutting, barren quartz and carbonate stringers, and fine-grained pyrite disseminated along chloritic and hematitic seams, was assayed by the authors and returned 0.25 ounce per ton gold (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Additional prospecting by P. Moses on a small lake to the northeast returned assays of 0.05 ounce per ton gold and 1.5 ounces per ton silver from quartz veins and altered granitic to syenitic rocks (*ibid*). Tourmaline is ubiquitous in samples collected from this area. The bedrock source of the mineralized float may be located in this vicinity.

Recent prospecting in 1999 confirms the observations and recommendations of Milne (1967) and Schnieders *et al.* (1996), in suggesting that there are more undocumented gold occurrences in this area. The margins of the Beggs Lake stock and contacts with the host metavolcanic rocks are considered excellent target areas for gold mineralization. Northwest- and north-trending faults have already been identified as gold-bearing structures, and all faults should be thoroughly prospected. Key alteration minerals include carbonate (ankerite and calcite), tourmaline, green mica, pyrite, chlorite and hematite. Further work, including abundant power stripping, prospecting, induced polarization (IP) and other geophysical surveys and diamond drilling, are recommended.

Platinum Group Element Occurrences within the Black-Pic Batholithic Complex

Recent prospecting and exploration in the Black-Pic batholithic complex (BPBC) (Milne 1968), east and southeast of Manitouwadge, have led to the discovery of several new copper-nickel-PGE occurrences, including those at Bulldozer Lake, Tyko Lake and Moshkinabi Lake (Figure 4). The Bulldozer Lake area has been recommended for prospecting by the Ontario Geological Survey since the mid-1980's, starting

with D. Tortosa (Bennett *et al.* 1987). Following field investigation of the Shabotik occurrence in 1988, Schnieders and Smyk (1989) reiterated this recommendation and drew attention to an elliptical, 10 km by 6 km aeromagnetic anomaly centered on Bulldozer Lake, approximately 5 km north-northwest of the Shabotik occurrence (Ontario Department of Mines - Geological Survey of Canada 1963a). The Shabotik PGE occurrence, hosted by hornblende, hornblende gabbro and monzodiorite, returned values of up to 1.99% Ni, 2.66% Cu, 3050 ppb Pt, and 1125 ppb Pd (Schnieders and Smyk 1989). Follow-up recommendations for this area, and its environs within the BPBC, were given by Schnieders and Smyk (1990, 1997) and Schnieders *et al.* (1991, 1992, 1993, 1996, 1998, 1999). The Bulldozer Lake mafic/ultramafic intrusive complex occurs at an intersection of northeast- and northwest-trending lineaments. It is important to note that the Bulldozer Lake complex has never been mapped at any scale.

Bulldozer Lake Occurrences

Recent timber cutting activity has created new access into northern Shabotik Township and into the southeastern margin of the Bulldozer Lake complex. Prospecting by Gryphon Metals Corporation on their property led to the discovery of a new, PGE-bearing, base metal occurrence. The occurrence was discovered in May, 1999 by prospectors L. Halverson and L. Cox (L. Halverson, Prospector, personal communication, 1999). The occurrence is located at UTM coordinates NTS: 16U; northing 5422415, easting 0616026, and is accessible via logging roads (403-134) approximately 78 km north of White River, and 13.2 km from the Shabotik River bridge. The prospecting activity was part of an initial program of linecutting and geophysics.

Hornblende gabbro and hornblende, in contact with granite and tonalite gneiss of the BPBC (cf. Milne 1968), occur near the margins of the intrusion. Plotting the location of the occurrence on the regional airborne magnetic map (Ontario Department of Mines - Geological Survey of Canada 1963a), indicates that the occurrence coincides with the flank of a magnetic "high". The mafic to ultramafic rocks are intruded by numerous, granite-gneiss dikes striking 320° to 360°. A faint fabric (possibly layering) is apparent in some of the mafic rocks at 280° to 310°. Several mafic breccias, consisting of mafic to ultramafic fragments hosted in a felsic matrix, were observed.

Sulphide minerals are hosted within northwest-striking shear zones. The main showing consists of a northwest-striking zone up to 1 m wide, traceable for approximately 5 m. Chalcopyrite and pyrite occur as disseminated grains, as well as stringer and net-textured veinlets, that locally reach amounts up to 30%. The sulphide minerals occur in a hornblende-phyric gabbro which contains pale green, sausseritized feldspars. Where sulphide minerals are present, the rocks are relatively non-magnetic, while alternating layers of sulphide-poor rock are magnetic. The sulphide mineral seams suggest remobilized, hydrothermal mineralization.

Several other outcrops containing disseminated sulphide minerals were observed over several hundred metres of strike length, suggesting that mineralization is widespread and the area requires further prospecting, stripping and exploration. Samples collected by the senior author assayed up to 2.1% Cu, 628 ppm Ni, 179 ppb Pd and 40 ppb Pt (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Assays collected by Inco Limited returned up to 3.9% Cu, 567 ppm Ni, 497 ppb Pd, 49 ppb Pt and 47 ppb Au (D. Wallster, Gryphon Metals Corporation, personal communication, 1999).

Tyko Lake Occurrence

The Tyko Lake occurrence was discovered in October, 1999, by B. Mealey and I. Spence during a helicopter-supported, OPAP-assisted prospecting trip designed to relocate an occurrence reportedly discovered in the early 1970's by a hunter named Tyko (B. Mealey, Prospector, personal communication, 2000). The occurrence is located approximately in McGill Township, 30 km southeast of Manitouwadge, 1.5 km southeast of the middle of Pickle Lake and 9 km west-southwest of the aforementioned Bulldozer Lake occurrences. It is situated within the BPBC, approximately 4 km from the southwestern margin of the Bulldozer Lake aeromagnetic "high" (Ontario Department of Mines - Geological Survey of Canada 1963), near a northeast-striking lineament which has a coincidental aeromagnetic "high" signature, presumably related to a diabase dike. Several small aeromagnetic anomalies are also present in the vicinity of the

occurrence (Geological Survey of Canada 1997).

The local geology and mineralization has been described (Freewest Resources Canada Inc., World Wide Website, <http://www.freewest.com>; Press Release, December 15, 1999):

Mineralization at Tyko Lake is hosted in coarse-grained pyroxenite or hornblende, and is characterized by coarse, skeletal amphibole, igneous breccias and some textural and compositional variability. Some of the host rocks are altered to chlorite as well as serpentine and talc confirming its ultramafic composition. The higher-grade samples consist of coarse-grained pyroxenite bearing appreciable to abundant disseminated and net textured pyrite, pyrrhotite and chalcopyrite and are strongly magnetic. Outcrops of granodiorite are situated in the locale of mineralization suggesting that it may be related to the margin of the granite in an ultramafic host.

The Tyko Lake property consists of 18 mineral claims comprising 10,160 acres covering discrete mafic to ultramafic intrusions of the predominantly granodioritic, Black-Pic River [sic] batholith. Recent prospecting on the property by Thunder Bay prospectors, Ian Spence and Larry Mealey resulted in a new discovery of nickel-copper-PGE mineralization assaying up to 3.84% nickel, 1.00% copper and 2.43 g/t PGE. Eight large grab samples of mineralized hornblende outcrop, collected from an area measuring 25 metres by 25 metres average 1.8% nickel, 0.60% copper and 1.19 g/t PGEs. Detailed assay results from the outcrop are as follows:

Cu (%)	Ni (%)	Pd (ppb)	Pt (ppb)	Au (ppb)	Total PGE (ppb)
0.42	0.58	411	367	105	883
0.57	0.74	408	303	43	754
0.89	2.17	1591	789	54	2434
1.00	1.04	778	441	46	1270
0.02	0.05	98	81	5	184
0.86	3.82	624	444	61	1129
0.45	0.69	1085	840		2000
0.55	2.44	621	196	17	834

(n.b. italicized assays were returned by Resident Geologist's staff (Resident Geologist's Files, Thunder Bay South District, Thunder Bay)

Thin section petrographic analysis reveals that the host rock is a dark green, unaltered, medium- to coarse-grained hornblende. Pyrrhotite, chalcopyrite, pyrite and pentlandite occur as disseminated grains, blebs and veinlets. Associated gangue minerals include chlorite, saussuritized plagioclase and quartz, which envelop the sulphide veinlets.

Freewest Resources Canada Inc. and Sparton Resources Inc. entered into an option agreement in December, 1999, that gives each the right to earn a 50% interest in the property (ibid). The partners are in the process of compiling all government and private sector data in preparation for the undertaking of a property-wide airborne geophysical survey anticipated to take place early in 2000 (ibid; Freewest Resources Canada Inc., World Wide Website, <http://www.freewest.com>; Press Release, December 23, 1999).

Moshkinabi Lake Occurrence

A new PGE-bearing, base metal occurrence was discovered by G. and M. Gionet in November, 1999, south of Moshkinabi Lake, approximately 20 km east of Manitouwadge, along the northern margin of the BPBC. The occurrence is hosted by ultramafic intrusive rocks of the Faries Lake-Moshkinabi Lake intrusive complex (Williams and Breaks 1989; 1990a,b) which is associated with metavolcanic rocks of the Manitouwadge greenstone belt. Both the intrusive and supracrustal rocks apparently form thin screens within the enveloping tonalitic terrain (ibid). This area had first been recommended for copper-nickel-PGE exploration by Schnieders and Smyk (1990) and Schnieders *et al.* (1991) following reconnaissance mapping by Williams and Breaks (1989; 1990a,b). A gabbro-hosted, copper-nickel-mineralized zone, the Gionet occurrence, was described by Schnieders *et al.* 1996) along the western margin of the Faries Lake-Moshkinabi Lake complex.

This newly discovered occurrence is hosted by medium- to coarse-grained, possibly amphibolitized melagabbro or peridotite. Disseminated and net-textured pyrrhotite, chalcopyrite and pentlandite are

ubiquitous. Grab samples returned the following assays (Resident Geologist's Files, Thunder Bay South District, Thunder Bay):

Sample No.	Cu (ppm)	Ni (ppm)	Pt (ppb)	Pd (ppb)	Au (ppb)	Co (ppm)
99 BGG-05	2560	1376	88	491	ND	145
99 BGG-06	2859	1738	56	645	8	183
99 BGG-07	2720	1380	104	612	10	150
99 BAGG-1	5443	1692	397	1016	36	140

Similar rocks have been noted in reconnaissance mapping (Williams and Breaks 1989; 1990a,b) and inferred from aeromagnetic surveys (Ontario Department of Mines - Geological Survey of Canada 1963b; Geological Survey of Canada 1997) in the McGraw-Faries lakes area to the south, and in a northeast-trending belt extending towards Ice Lake. These rocks and anomalies should be investigated for their copper-nickel-PGE potential.

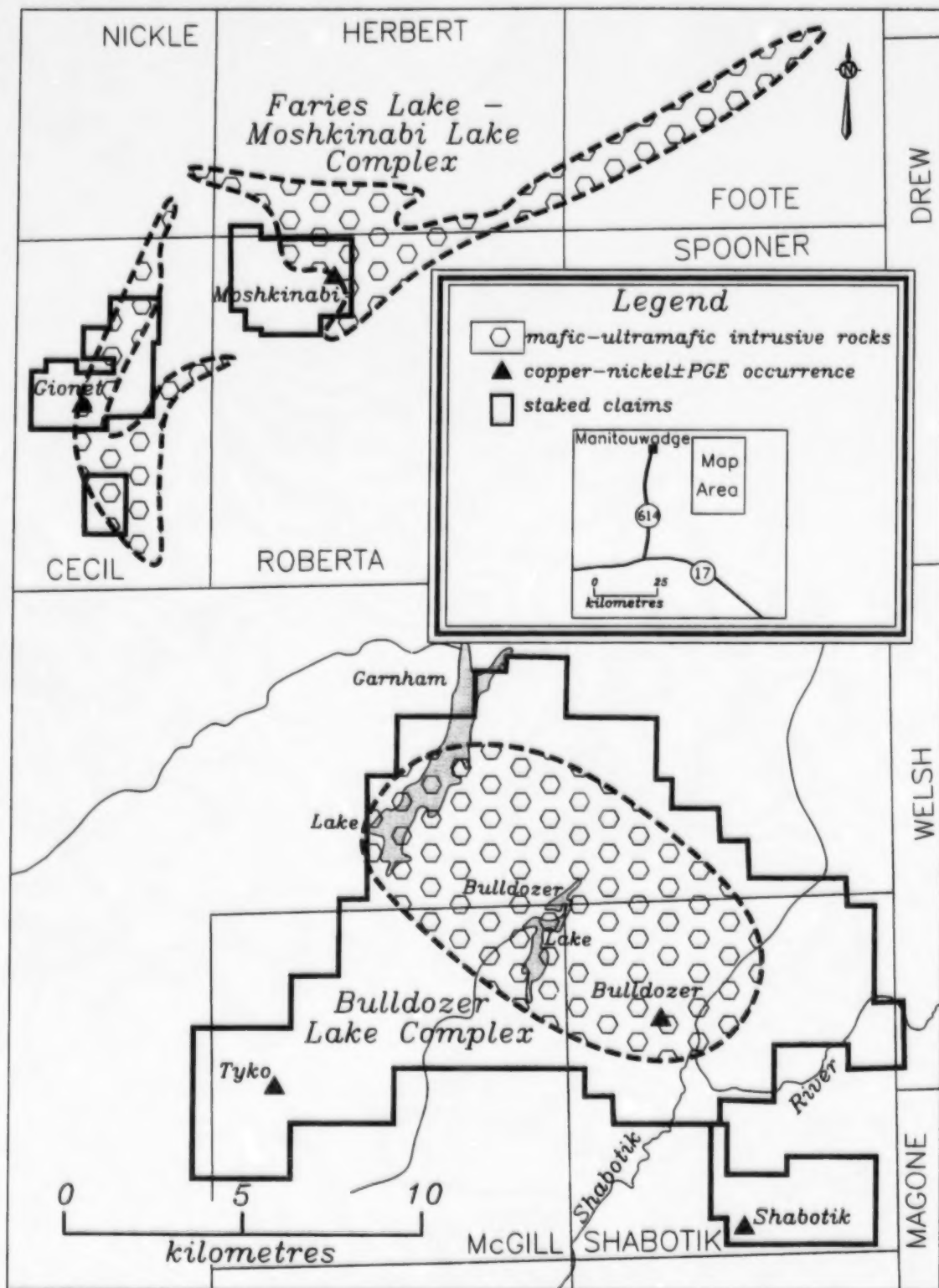


Figure 4. Copper-nickel-platinum group element occurrences in the Bulldozer Lake area.

RECOMMENDATIONS FOR EXPLORATION

Base and Precious Metal Potential of the Highway 527 Corridor

With the release of the results of airborne geophysical and geochemical surveys conducted as part of the Ontario government initiative, "Operation Treasure Hunt", in mid-2000, it is worthwhile to review areas of high mineral potential along the Highway 527 corridor between Thunder Bay and Armstrong. Portions of these areas were covered by the Garden-Obonga lakes airborne geophysical survey under performed under "Operation Treasure Hunt" (<http://www.gov.on.ca/MNDM/MINES/oth/>).

Several small, but important greenstone belts are located within the area. These are the Obonga Lake belt; the Garden Lake-Kearns Lake belt; the Heaven Lake – Whistle Lake belt; and the Max Lake belt. Of these, only the Max Lake belt can be directly traced to the northeast under Lake Nipigon and Proterozoic cover rocks and is the strike extension of the Beardmore – Geraldton volcanic belt. The eastern extensions of all of these belts trend under the flat-lying, Mesoproterozoic sedimentary rocks and associated diabase sheets.

Obonga Lake Belt

The northernmost of these belts is the Obonga Lake belt; it trends from Kershaw Lake in the west to the Obonga Lake area in the east, where the metavolcanic terrain is covered by the Proterozoic rocks. The Obonga Lake area has been the focus of prospecting since chromite mineralization associated with serpentinites was discovered in 1928 (Graham 1930). The area has been mapped by Graham (1930), Kustra (1966; 1967a,b), and Thurston (1967; 1968a,b,c,d,e,f). Kidd (1933) and Hurst (1931) described the detailed geology of the chromite deposits and Karvinen (1968) described the geology of the ultramafic host rocks.

The Obonga Lake belt is a sequence of northeast-trending, synclinally folded metavolcanic and metasedimentary rocks. In the western part of the belt, north of Tommyhow Lake, there is a thick sequence of felsic metavolcanic rocks and associated quartz porphyry intrusions; the eastern portion is dominated by mafic to intermediate volcanic rocks. The metasedimentary rocks associated with the volcanic belt consist of conglomerate, arkose, wacke and slate (*ibid*).

The supracrustal rocks of the Obonga Lake belt have been intruded by mafic to ultramafic rocks. Serpentinized ultramafic rocks host the chromium deposit at Chrome Lake and the nickel-copper-PGE mineralization at Puddy Lake. A small, exploratory development was undertaken in the 1930's to assess the chromium deposits. A 350 foot (107 m) shaft and some lateral work was completed. Ore was hauled out for testing along a winter road from the mine site north to Collins on the Canadian National Railway mainline (Johnson and Blomberg 1990).

The best potential for volcanogenic massive sulphide (VMS) deposits within the belt are areas underlain by felsic metavolcanic rocks. These occur at the western margin and along the southern contact of the belt. The best potential for Cu-Ni-PGE deposits lies with the gabbro and peridotite / serpentinite intrusions that occur near the northeastern edge of the belt.

Garden Lake-Kearns Lake Belt

The Garden Lake – Kearns Lake metavolcanic belt is situated south of the Obonga Lake belt. Mineral exploration activity in the belt has increased substantially in recent years. The Garden Lake-Kearns Lake area has been explored for gold since 1947 when Little Long Lac Mines Ltd. conducted an exploration program at Garden Lake (Phelan 1947). Visible gold, associated with arsenopyrite, was reported by Phelan (1947) to occur in a quartz stockwork on the eastern side of Conick Lake. Grab samples returned assays as high as 1.23 ounces per ton gold (*ibid*).

Although most of the early work was done in the late 1940s, it was not until the area was logged that the more recent exploration took place. Timber cutting by Abitibi Consolidated Inc., in the last decade has

provided access to most of the Garden Lake area. Timber cutting, more than any other non-mining activity, is responsible for the resurgence of mineral exploration in the area by providing a good road network for access. Garden Lake Resources conducted an airborne magnetometer and electromagnetic survey that covered most of the area around Garden Lake. A group of conductors was delineated north of Garden Lake and south of the main road to Kearns Lake. This area contains zones and lenses of pyrite (Assessment files, Resident Geologist's Office, Thunder Bay). Massive to brecciated pyrite and pyrrhotite are exposed north of Highway 811, approximately 3.2 km southwest of Ruffo Lake. The rock also contains a significant amount of magnetite. Analysis of some of this sulphide-rich material yielded 19 ppb Au, 335 ppm Zn, 90 ppm Cu and 66 ppm Ni (Resident Geologist's Files, Thunder Bay South District, Thunder Bay).

Gold is the main commodity sought after in the belt, but the potential for base metal mineralization should not be overlooked. The impending release of the "Operation Treasure Hunt" airborne survey should provide a good tool for further exploration or re-evaluation of known geophysical anomalies.

Heaven Lake – Whistle Lake Belt

This metavolcanic belt has been traced from Graham in the west to east of Highway 527. Previous exploration in the Highway 527 corridor in the Whistle Lake area was limited to the typical "fly-and-drill" scenario that was prevalent in searching for base metal deposits in the 1960s and 1970s. Anomalies that were detected by airborne surveys were staked and diamond drilled with little or no geological survey follow-up. In light of the current understanding of VMS deposits, these areas should be re-evaluated. Much of the previous diamond drilling did, in fact, intersect possible alteration halos, although their significance was not understood. Many diamond-drill holes also intersected significant, although not ore grade, zinc and copper mineralization (Assessment Files, Resident Geologist's Office, Thunder Bay).

There has been no detailed mapping in this belt. The only published maps are those of Milne (1964) and Sage *et al.* (1974); both of these are reconnaissance-scale maps. Exploration companies first showed interest in the area during the initial stages of the construction of Highway 527 in the early to mid-1960's. Any detailed mapping was confined to exploration grids.

The presence of VMS-style, altered rocks is documented in various drill logs (Assessment Files, Resident Geologist's Office, Thunder Bay). Companies such as Phelps Dodge Corporation of Canada, Ltd., Amoco Petroleum Company, Dome Ltd., Hanna Mining, and Steep Rock Iron Mines, have intersected iron sulphide-bearing zones (some as wide as 15 m) accompanied by "white mica and siliceous bands", "garnets", "banded acid tuffs", "5-10% cordierite", "chlorite-actinolite alteration", and "mottled alteration" (*ibid*). No alteration studies were conducted because, at that time, the significance of alteration with respect to VMS deposits was not appreciated.

It is apparent that many of the "fly-and-drill" anomalies were tested with only one, shallow, diamond-drill hole and some were not tested at all. In many cases, only limited geological data were recorded. Oversights had to have occurred.

Most of the following is taken from Sage *et al.* (1974). It was summarized in Lavigne *et al.* (1992), and is presented here with updates where required. The Heaven Lake-Whistle Lake belt is an easterly trending belt of metavolcanic and metasedimentary rocks of varying width, with a exposed strike length of over 70 km. West of Chisamore Lake, the metavolcanic rocks strike under extensive Quaternary cover associated with the Kaiashk Moraine. Towards the east, the belt strikes under Mesoproterozoic rocks of the Sibley Group. Within these limits, extensive logging and forest fires have exposed considerable outcrop throughout the area. Sage *et al.* (1974) located previously unmapped rhyodacite/rhyolite. This unit is exposed along a logging road just north of McLay Lake and locally contains disseminated pyrite and chalcopyrite. An intermediate to felsic volcanic pyroclastic breccia of probable dacitic composition occurs about 0.4 km northwest of an unnamed lake, approximately 2.4 km southwest of Whittom Lake. To the north, this pyroclastic unit is in contact with a banded, chert-carbonate horizon that appears to be in excess of 15 m wide. Local silicification is apparent within this unit.

A good cross section of this felsic portion of the belt can be examined in road cuts along Highway 527. At the south end of a long, straight section, south of Abitibi Camp 230, a hornblende-rich monzonite is in sharp, intrusive contact with a banded amphibolite. This amphibolite is greater than 120 m thick and is in contact to the south with felsic tuffs and pyroclastic rocks that are 0.8 km thick. These felsic metavolcanic rocks are separated from the mafic metavolcanic rocks to the south by a massive, quartz-feldspar intrusion that is exposed all the way to the Whistle Lake road. Mafic metavolcanic rocks interdigitate with this felsic porphyry unit south of the Whistle Lake road. Further to the south, this porphyry is in contact with more equigranular, trondhjemitic to granodioritic rocks (Resident Geologist Files, Thunder Bay South District, Thunder Bay).

Numerous occurrences of disseminated pyrite and chalcopyrite, with local, massive lenses associated with the felsic metavolcanic rocks, would suggest that the area should be thoroughly examined for base metal mineralization. Values of up to 0.11% Cu over 1.5 m and up to 0.76% Zn were encountered in two holes by Phelps Dodge in 1975 (Assessment Files, Resident Geologist's Office, Thunder Bay). A zone of copper-mineralized rocks within the felsic metavolcanic rocks has been sampled near where Nault Creek crosses Highway 527. Grab samples from this zone assayed up to 1.4% Cu and 0.349 ounce Au per ton (Resident Geologist's Files, Thunder Bay South District, Thunder Bay). Small pods and wisps of sphalerite were also noted in the outcrops. Copper mineralization is manifested in the development of bornite, chalcopyrite and malachite. The felsic metavolcanic rocks exhibit sericitic alteration (*ibid*). A zone of disseminated chalcopyrite and pyrite occurs in intermediate to mafic metavolcanic rocks 1.25 km south of the Nault creek crossing. Grab samples from this locality assayed 0.89% Cu and 16 000 ppb Au (*ibid*).

Max Lake - Peevy Lake Belt

The Max Lake belt also has potential for base metal mineralization. Massive sulphides crop out in a small road cut, approximately 1200 m south from a point where the Poshkokagan River crosses Highway 527. This is on strike with a similar occurrence located to the northeast, on the shore of McCuaig Lake. Wispy sphalerite was found in a diamond-drill hole bored by Canamax in 1984 (Resident Geologist Files, Thunder Bay South District, Thunder Bay). This zone was being drilled for gold and the sphalerite-bearing section was not split nor assayed. This zone is associated with a silicified iron formation, located between Max Lake and Geddes Lake. Other gold occurrences exist in the belt. One of these is the Fat Beagle occurrence (Lavigne and Scott 1996) where prospector Dave Christianson had grab samples return values of up to 2.4 ounces per ton gold (Resident Geologist Files, Thunder Bay South District, Thunder Bay).

The Peevy Lake area has been documented by Schnieders *et al.* (1999) as a potential area for base metal exploration. It contains felsic metavolcanic rocks, cherty exhalites, hydrothermally altered zones and sulphide mineral-rich zones. Further exploration is warranted.

This illustrates that the relatively small metavolcanic belts west of Lake Nipigon do have potential for base metals, gold and PGE. With the release of the "Operation Treasure Hunt" geophysical and lake bottom sediment geochemical data for the area, it would be worthwhile to do an assessment work search and consider an exploration program in the Highway 527 corridor.

MAFIC AND ULTRAMAFIC ROCKS IN ADRIAN AND CONMEE TOWNSHIPS

Due to the recent increases in the prices of nickel, palladium and platinum, mafic and ultramafic rocks in Adrian and Conmee townships have become extremely attractive, and are recommended as an exploration target. Mafic to ultramafic rocks are shown on the compilation map (Ontario Geological Survey 1991) covering an 8 km by 3 km area, in eastern Adrian and western Conmee townships. The Thunder Lake - Peridotite Lake property, recently worked by Winslow Gold Corp. in 1995, is described as having chalcopyrite and pyrrhotite in mafic and ultramafic rocks, in the Marble and Mel lakes areas (Assessment Files, Resident Geologist's Office, Thunder Bay). The area was recommended as a copper-nickel target in Winslow Gold's summary report (*ibid*). Assay values of up to 3% Ni+Cu have been reported from grab samples (M. Stewart, Prospector, personal communication, 2000). Samples of a coarse-grained pyroxenite,

collected by Winslow Gold Corp., returned up to 601 ppm Ni, 660 ppm Cr, 85 ppm Cu and 83 ppm Co. No PGE values were reported; there has been little routine assaying for PGE.

Recent humus and till sampling by A. Bajc of the OGS (Bajc 1999a), identified a major, nickel-copper-cobalt target (from both till and humus anomalies) in eastern Adrian and western Conmee townships. Rogers and Berger (1995) also recommended the area as a potential copper and nickel target. Moderate- to high-intensity electromagnetic conductors are associated with ultramafic and mafic metavolcanic and intrusive rocks east of Peridotite Lake (OGS 1991). A major, northwest-trending fault / lineament trends from this area, west-northwest, towards the Crayfish Creek fault and the Inco Shebandowan Mine, which produced 8.64 million tons grading 1.92% Ni, 0.98% Cu and 2.62 g/t PGE (W. Vanderklift, INCO Limited, personal communication, 2000). It is the authors' opinion that mafic and ultramafic rocks in the Adrian and Conmee townships area warrant thorough prospecting for copper, nickel, chromium, cobalt and the platinum group elements.

OGS ACTIVITIES AND RESEARCH BY OTHERS

1) T. Hart, Precambrian Geoscience Section, OGS, carried out 1:20 000 scale mapping in the Garden Lake greenstone belt, approximately 150 km north of Thunder Bay. The map area (portions of NTS sheets 52G/08, /09; 52H/05, /11, /12), covering most of the belt, is centered on Garden Lake, and extends from west of Kearns Lake to east of the Garden Lake road (Highway 811) (Hart 1999). The belt is an east-trending, south-facing sequence of dominantly mafic metavolcanic rocks with minor, interbedded intermediate and felsic metavolcanic and metasedimentary rocks, bounded by felsic plutonic rocks (ibid). The belt hosts a number of gold showings and sulphidic iron formations. Mapping has also provided information on the distribution of alteration and lithogeochemistry of the metavolcanic and mafic intrusive rocks. This information, combined with stratigraphic analysis, will facilitate a systematic evaluation of the belt's gold, volcanogenic massive sulphide and platinum group element potential. Additional exploration recommendations were made by Hart (1999).

2) T. Morris, Sedimentary Geoscience Section, OGS, completed Quaternary mapping and surficial sampling in the Killala Lake - Coldwell area, mid-way between Terrace Bay and Marathon (Morris 1999). The map area, covering NTS sheets 42D/15 and 42E/02, straddles the Trans-Superior Tectonic Zone (TSTZ), a prominent structure that extends north-northeast from Lake Superior that hosts the Mesoproterozoic Coldwell and Killala Lake alkaline complexes, the Dead Horse Creek diatreme complex and the Prairie Lake carbonatite (Sage and Watkinson 1995). Supracrustal rocks of the Schreiber-Hemlo greenstone belt occupy the southern quarter of the map area. Metamorphic and plutonic rocks of the Quetico subprovince predominate in the northern portion of the area (Williams 1989).

Modern alluvium samples were collected and submitted for gold grain, kimberlite indicator mineral (KIM) and magmatic massive sulphide indicator mineral (MMSIM[®]) analysis. A series of orientation surveys will provide information critical in assessing these heavy mineral data. Till ("B" and "C") and humus samples were collected for geochemical and/or heavy mineral analysis. Till samples were also collected up-ice, over and down-ice of known gold-mineralized rocks (Empress East), the Prairie Lake carbonatite, and a base metal occurrence (Spider Lake) (ibid). Gabbro, syenite and lamprophyres were collected and submitted for comparative heavy mineral analysis. This area has also been suggested for kimberlite exploration by Sage (1999a,b). Adjacent map sheets 42D/14 and 42E/03 are slated for mapping and sampling in 2000.

3) A. Bajc, Sedimentary Geoscience Section, OGS, completed the second year of a two-year program of Quaternary mapping and "C"-horizon till sampling in the Shebandowan greenstone belt, west of Thunder Bay. In 1998, NTS sheets 52A/05 (Kakabeka Falls) and 52A/12 (Sunshine) were covered (Bajc 1999a). Mapping and sampling in 1999 extended over NTS sheets 52B/09 (Shebandowan) and 52B/10 (Burchell Lake) (Bajc 1999b). This program was designed to collect data that would, in turn, generate new precious and base metal exploration targets.

A total of 400 "C"-horizon till samples were collected. Sample density over greenstone belt rocks approaches one sample per 3 km² (ibid). Samples were collected at, or close to, the bedrock-till interface for geochemical, gold grain, kimberlite indicator mineral (KIM) and magmatic massive sulphide indicator mineral (MMSIM[®]) analysis. A map, depicting gold grain concentrations in till in the western Shebandowan belt (Bajc 1999c), was released in late 1999. Mineralized float samples were also collected for precious and base metal assay.

4) J. Jackson and R. Dyer, Sedimentary Geoscience Section, OGS, conducted a helicopter-supported lake bottom sediment and water geochemical survey in the Shebandowan and Saganagons greenstone belts (Jackson and Dyer 1999). The survey covered approximately 3500 km² over NTS map sheets 52B/02, /07, /09, /10 and /11. Samples were collected at 1464 sites, yielding an average sample density of one sample per 2 km² (ibid). Where possible, organic lake sediment and water samples were collected. Water samples were analyzed for pH and electrical conductivity. Greenstone terrains generally yielded water samples with slightly alkaline pH values and relatively high conductivity (ibid). This survey dovetails with a similar, recent survey in the Atikokan area (Dyer 1999).

5) T. Muir, S. Jackson and G. Beakhouse, Precambrian Geoscience Section, OGS, continued compilation work of recent mapping and research in the Hemlo greenstone belt (Muir et al. 1999). This 1:50 000 scale compilation with encompass mapping, structure, metamorphism and magmatism in order to provide a proper context for the Hemlo gold deposit.

6) "Operation Treasure Hunt (OTH)" is a two-year, Ontario Ministry of Northern Development and Mines initiative supported by funding from the Ontario government (<http://www.gov.on.ca/MNDM/MINES/oth/>). OTH began on April 1, 1999 and will end on March 31, 2001. Two airborne geophysical surveys were initiated in the Thunder Bay South district in 1999. The Schreiber-Terrace Bay area was covered by a magnetometer and frequency-domain electromagnetic (EM) survey from November 1, 1999, to January 31, 2000 that was awarded to High-Sense Geophysics Limited. An identical survey was flown during the same period west of Lake Nipigon by Digheem division of Geotrex-Digheem.

7) The Western Superior National Mapping (NATMAP) project, initiated in 1997, continued in 1999. A cooperative program involving the Geological Survey of Canada, provincial surveys (including the OGS) and universities, NATMAP is attempting to update our understanding of the tectonic framework for greenstone-granite subprovinces in the western Superior Province (Percival et al. 1999). Other research, reconnaissance and mapping projects are operating in collaboration with the NATMAP in the Wabigoon, Uchi and Sachigo subprovinces. Tectonic interpretations will also provide a framework for metallogenetic models for volcanogenic massive sulphide and gold deposits (ibid).

8) Dr. W. Schwerdtner and S. Ahmad, University of Toronto, Toronto, Ontario, conducted work on dikes exposed in Archean tonalite-trondhjemite-granodiorite (TTG) complexes of the Ignace-Atikokan area (Schwerdtner and Ahmad 1999). This project, affiliated with LITHOPROBE, is designed to provide new insight into late-orogenic, dynamic tectonic processes.

9) N. Pettigrew (M.Sc. candidate, University of Ottawa, Ottawa, Ontario) is working on the Samuels Lake mafic-ultramafic intrusion and its associated copper-nickel-PGE mineralization. B. Lassen (Ph.D. candidate, University of Ottawa, Ottawa, Ontario) is studying the petrology and petrochemistry of other Quetico intrusions in the Atikokan area. Both theses are supervised by Dr. K. Hattori.

10) Dr. A. Naldrett (University of Toronto, Toronto, Ontario) is investigating Mesoproterozoic (Keweenaw) Midcontinent Rift-related, mafic to ultramafic intrusions in the Thunder Bay area in conjunction with M.C. Smyk and J.F. Scott of the Thunder Bay South Resident Geologist's Program. Samples collected in 1999 will be analyzed to determine the nickel content of the constituent olivine crystals. These data will help in determining crystallization sequence and conditions for the various sills, dikes and related intrusions and suggest targets for copper-nickel-PGE exploration.

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11) Dr. B. Simonson (Oberlin College, Oberlin, Ohio) investigated Archean and Proterozoic sedimentary rocks in the Thunder Bay area, looking for evidence of ejecta generated by Precambrian meteorite impacts. He has conducted similar research in South Africa and Australia.

12) Dr. G. Williams (The University of Adelaide, Adelaide, South Australia) conducted some preliminary field work prior to a planned paleomagnetic study of taconite and other, iron-rich sedimentary rocks of the Paleoproterozoic Gunflint Formation.

13) R. Salo, M.Sc. candidate, Lakehead University, Thunder Bay, Ontario, is studying ore-forming processes at the Lac des Iles Mine in developing an exploration model.

Table 5. Publications received by the Thunder Bay South Resident Geologist's Office in 1999.

Title	Author(s)	Type and Year of Publication
An interpretation of high resolution aeromagnetic data over the Manitouwadge greenstone belt, Ontario, Canada	W. F. Miles	Unpublished, M.Sc. thesis, University of Ottawa, Ottawa, Ontario, 1998, 243p.
Geological evolution of the Manitouwadge greenstone belt and Wawa-Quetico subprovince boundary, Superior Province, Ontario, constrained by U-Pb zircon dates of supracrustal and plutonic rocks	E. Zaleski, O. van Breemen and V.L. Peterson	Canadian Journal of Earth Sciences, v.36, p.945-966 (1999)
Structural history of the Manitouwadge greenstone belt and its volcanogenic Cu-Zn massive sulphide deposits, Wawa subprovince, south-central Superior Province	V.L. Peterson and E. Zaleski	Canadian Journal of Earth Sciences, v.36, p.605-625 (1999)
Growth and demise of an Archean carbonate platform, Steep Rock Lake, Ontario, Canada	T.M. Kusky and P.J. Hudleston	Canadian Journal of Earth Sciences, v.36, p.565-584 (1999)
Archean carbonate-bearing alkaline igneous complexes of the western Quetico metasedimentary belt, Superior Province, Ontario	K. Hattori and J.A. Percival	Current Research 1999-C, Geological Survey of Canada, p.221-231 (1999)
The mafic-ultramafic intrusions of the Atikokan-Quetico area, northwestern Ontario	A.D. MacTavish	Ontario Geological Survey, Open File Report 5997, 154p.
Mineral potential of Proterozoic Keweenaw Intrusions: Implications of major and trace element geochemical data from bimodal mafic and felsic sequences of Mamainse Point and the Black Bay Peninsula, Ontario	P. Lightfoot, R. Sage, W. Doherty, A. Naldrett and R. Sutcliffe	Ontario Geological Survey, Open File Report 5998, 91p.
Gold grains in till, western Shebandowan greenstone belt, northwestern Ontario	A.F. Bajc	Ontario Geological Survey, Preliminary Map P.3417, scale 1:100 000
Precambrian geology, Entwine Lake area	D. Stone and J. Hallé	Ontario Geological Survey, Preliminary Map, P.3400, scale 1:50 000
Atikokan high density lake sediment and water geochemical survey, northwestern Ontario: New Au and PGE exploration targets*	R.D. Dyer	Ontario Geological Survey, Open File Report 5986, 83p.
Regional humus and till sampling survey of the eastern part of the Shebandowan greenstone belt, northwestern Ontario*	A.F. Bajc	Ontario Geological Survey, Open File Report 5993

* data also released in digital form

Table 6. Mineral deposits not being mined in the Thunder Bay South District in 1999.

Abbreviations					
AF	Assessment Files	MLS	Mining Lands, Sudbury		
CMH.....	Canadian Mines Handbook	MR	Mining Recorder		
GR.....	Geological Report	NM	The Northern Miner		
MDC.....	Mineral Deposit Circular	OFR.....	Open File Report		
MDIR.....	Mineral Deposit Inventory record	PC.....	Personal Communication		

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Anderson Lake 52A/10NE	Mo	1 346 000 T @ (grade unstated)	Open for staking	W.N. Ingham (16/06/59) in Prospectus, Lindsay Explorations Ltd. (19/06/59)	Inactive
Ardeen Mine 52B/10SE,SW	Au	90 650 T @ 15.3 g/T Au (uncut) [84 904 T @ 11.6 g/T Au, assays cut to 2 oz Au /t]; inferred resource of 1 082 939 T @ 14.4 g/T Au (uncut) [991 739 T @ 11.2 g/T Au, assays cut to 2 oz Au /t]	Pele Mountain Resources Inc. (CMH 1999-2000, p.332)	The Ontario Prospector, v.1, no.3, p.35 (1998); CMH 1999-2000, p.332	Over \$2 M spent in exploration since acquisition in 1996
Atikokan Iron Mine 52B/14	Fe, Cu	12 000 000 T @ 35% Fe, 0.040% Cu	K. Bjorkman (Resident Geologist's Files)	NM (26/10/72)	Inactive
Aumacho (Brink) 42E/05SW	Li	759 475 T @ 1.65% Li ₂ O, plus 96 000 T @ 1.5% Li ₂ O	A. Hayes (Resident Geologist's Files)	GR 31, p.64 (1965)	Active; VLF-EM survey conducted in 1995
Coco-Estelle 42E/03SW	Au	53 700 t @10.7 g/t	Inmet Mining Corporation (Resident Geologist's Files)	AF	Inactive; last optioned to Battle Mountain Canada Ltd. 1996-97
Coldstream Porphyry 52B/10SE	Au	3.2 MT @ 0.066 opt Au	Newhawk Gold Mines Ltd. (CMH 1999-2000, p.295)	GK	Drilled by Noranda and Freewest 1990/1991; now seeking JV partner
Conway 52H/08NE	Li	1.83MT @ 0.96% Li ₂ O to 300 m	E.S. Conway (Resident Geologist's Files)	GR 31, p.68 (1965)	inactive
Coubran Lake 42D/16NW,SW	Cu, Fe, Ti, P	60 MT @ 0.2% Cu, 27% Fe, 5% Ti, 5% P; plus 32 MT @0.3% Cu, 23% Fe, 0.02% Ni, 2.48%Ti, 0.36% P	Franco-Nevada Mining Corp. Ltd. (CMH 1996-97, p.173)	AF (F.N. 2.14737; 1991)	87 leases and additional claims acquired from acquisition of Redstone Resources Inc.; last worked in 1991

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Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Dead Horse Creek North 42D/15SE	Pb, Zn, Ag	14 000 T @ 1.45% Pb, 7.28% Zn, 8.27 opt Ag	J. Halonen estate (Resident Geologist's Files)	Resident Geologist's Files	Inactive
Dead Horse Creek South 42D/15SE	Pb, Zn, Ag	35 000 T and 36 000 T (Zones 1 and 2) @ 19.87% Pb, 9.08% Zn, 27.65 opt Ag	J. McCabe (Resident Geologist's Files)	(Resident Geologist's Files)	Inactive
Dorion Mine 52A/15	Pb, Zn	Maximum of 35 000 T @ 10% Pb	D. Petrunka (Resident Geologist's Files)	Prospectus, Andowan Mines Ltd. (30/03/57)	Inactive
Elizabeth Mine 52B/13SE	Au	250 000 tons @ 4.57 g/t Au	Mimiska (Societe Miniere) Inc.	CMH, 1998-99, p.309	Inactive
Great Lakes Nickel 52A/4SE	Cu, Ni, PGE	45.6 MT @ 0.344% Cu, 0.183% Ni; Pt & Pd values	Great Lakes Nickel Limited	CMH, 1999-2000, p.199	1970's bulk sample and feasibility study
Hammond Reef 52B/14NW	Au	85 mt @ 0.93 g/t Au (= 2.56 million oz Au)	Pentland Firth Ventures Ltd. (CMH 1999-2000, p.333)	News release, Pentland Firth Ventures Ltd., 1997	1997: drilling, channel sampling and inventory calculation
Hemlo (Interlake) 42C/12NW	Au	10.8 M tons @ 0.216 opt Au (= 2 328 000 oz Au)	Franco-Nevada Mining Corporation Limited (CMH 1999-2000, p.174)	First-Quarter Report, Franco- Nevada Mining Corporation Limited, 1999	Advanced exploration drifting and underground diamond drilling 1998-1999; Teck Corporation and Homestake Canada Inc. have right of first proposal
Jack Lake 52B/14SW	Au	Possible: 75 000 T @ 0.35 opt Au and 3000 T @ 0.30 opt Au ¹ ; or 100 000 T @ 0.45 opt Au ²	M. Wicheruk (Resident Geologist's Files)	¹ OFR 5332, p.J-7 (1981) ² Annual Report, Asamera Inc. (1981)	Inactive
Jean Lake 42E/05NW	Li	1.689 MT @ 1.30% Li ₂ O	AG Armeno Mines and Minerals Inc. (CMH 1999-2000, p.22; Resident Geologist's Files)	Jean Lake Lithium Mines Ltd., Annual Report (1957)	Inactive
Lac La Croix 52B/05SW	Li	1.525 MT @ 1.27% Li ₂ O	Within Quetico Provincial Park	AF	Mining Lease of Occupation expired in 1970
M.N.W. 52H/04NE	Li	40 000 T "high-grade Li"	AG Armeno Mines and Minerals Inc. (CMH 1999-2000 p.22)	Geological Survey of Canada, Economic Geology Report 21, p.61 (1965)	Inactive

Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Marathon prospect 42D/16SW	Cu, Ni, PGE	44 million tons @ 0.37% Cu, 0.047% Ni; PGE values	Polymet Mining Corp. (CMH 1999- 2000, p.340)	CMH 1998-99, p.367	Plans to maintain leases in good standing; feasibility study conducted in 1989
McVittie 52H/08NE	Li	261 000 T @ 1.03% Li ₂ O	AG Armeno Mines and Minerals Inc. (CMH 1999-2000, p.22)	GR 31, p.89 (1965)	Inactive
Nama Creek 52H/08NE	Li	4 292 232 tons @ avg. 1.06% Li ₂ O	QSR Limited (CMH 1999-2000, p.347)	CMH 1999-2000, p.347	Inactive since 1957
Nicopor 42D/14NW	Ni, Cu	185 000 T @ 0.48% Ni, 0.26% Cu (0-90 m); plus 190 000 T @ 0.40% Ni, 0.12% Cu (90-180 m)	B. Fowler and M. Shuman	Zenmac Metal Mines Ltd., Annual Report (1970)	Optioned by Sterlingmarc Mining Ltd 1997; returned to vendors 1998
North Shores 42D/14SW	Au	Geological reserves of 2Mt @ 2.2 gpt Au (Afric Zone)	Autotrac Ltd.	Resident Geologist's Files	Explored in 1997 by Cyprus Canada Inc.; currently optioned to International Taurus Resources Inc.
Ontario Lithium (Jackpot) 42E/05SW	Li	1.18 MT @ 1.084% Li ₂ O	International Precious Metals Corporation (CMH 1997-98, p.250)	CMH 1997-98, p.250	Drilling in 1994
Pistol Lake 52B/09NW	Au	9.6 mt @ 1.4 g/t Au or 2.9 mt @ 2.6 g/t Au	D. Parker and B. D'Silva	GR	Drilled by Detector Resources Ltd. 1994-95
Powell 52B/07SW	Au	250 000 T @ 0.25 opT Au	Saganaga Resources	NM, Jan. 22, 1990	Milling bulk sample on site, 1992
Prairie Lake 42E/02SE	U, Nb, REE, wollastonite	200 000 T @ 1.8 lbs/T U ₃ O ₈ , 5.0 lbs/T Nb ₂ O ₅	AJ Perron Gold Corp. (CMH 1996- 97, p.26)	NM (03/05/79)	Prefeasibility study on cement/lime products completed with positive results; AJ Perron Gold Corp delisted 20/01/98
Sapawe Mine 52B/14SW	Au	528 614 T @ 0.31 opT Au	Allegheny Mines Corporation (CMH 1999-2000, p.28)	Press release, March 10, 1995	Diamond drilling, 1995
Sawbill Lake 52B/14	Au	66 600 T @ 0.20 opT Au		OFR 5332, p.J-4 (1981)	
Schreiber-Pyramid 42D/14SE	Au	107 T @ 0.71 opT Au	B. Fowler (Resident Geologist's Files)	Resident Geologist's Files	Inactive; last worked in 1992

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Deposit Name/ NTS	Commodity	Tonnage-Grade Estimates and/or Dimensions	Ownership References	Reserve References	Status
Silver Mountain 52A/04NW	Ag	60 000 T @ 5.0 opT Ag, 12% CaF ₂		NM (28/10/54)	
Silver Islet 52A/07SW	Ag	115 000 T @ 40 opT Ag in dump ¹ , plus 300 000 oz Ag in roof pillar ² , or 1 050 000 oz Ag ³ , plus 750 000 oz Ag in pillars and stopes ⁴	Cross estate (Resident Geologist's Files)	1MP 71, p.44 (1976) ² MRC 10, p.74 (1968) ³ NM (18/10/79) ⁴ NM (10/02/83)	Dump material processed ca.1984 by QC Explorations Ltd.
Snodgrass Lake 52B/10SE	Au	60 mt @ 1.1 g/t Au	Moss Lake Gold Mines Ltd. (CMH 1999-2000, p.284)	CMH 1999-2000, p.284	1996 evaluation work and drilling; seeking JV partner
Stewart / Fire Tower 52A/12SE	Au	60 000 t @ 3.0 g/t Au	M. Stewart	GR	Last explored by Avalon Ventures Ltd. 1997-1998
Sunbeam 52B/14	Au	4410 T @ 0.42 opT Au	Allegheny Mines Ltd. (CMH, 1999- 2000, p.28)	OFR 5332, p.J-2 (1981)	Acquired by Allegheny Mines Ltd. in 1996
Swamp River 52B/09SE	Au	998 000 T @ 0.12 opT Au (incl. 675 000 T @ 0.146 opT Au)	Band-Ore Resources Ltd. (CMH 1999-2000, p.56)	CMH 1999-2000, p.56	Bulk sample, feasibility study 1975; drilling 1987, 1995
Vanguard 52B/09NW	Cu, Zn, Au, Ag	East Vanguard: 100 000 T @ 1.8% Cu, 3.4% Zn, 0.22 opt Ag, 06 to 0.19 opT Au; West Vanguard: ~200 000 T @ 1.3% Cu, 1% to 2% Zn, 0.28 opT Ag	Optioned to Allegheny Mines Corporation (CMH 1999-2000 p.28)	News release, Allegheny Mines Corporation, Nov. 4, 1997	Drilling by Allegheny in 1997; 1998 exploration
Vegan 42E/05SW	Li	750 000 T @ 1.38% Li ₂ O	AG Armeno Mines and Minerals Inc. (CMH 1999-2000, p.22)	NM (22/03/56)	Inactive
Willecho and Willroy 42F/04NW	Cu, Zn, Ag	759 448 T @ 4.42% Zn, 0.28% Cu, 1.47 opt Ag (combined)	Noranda Inc. (The Chronicle-Journal 25/10/98)	Willroy Mines Ltd., Annual Report (1976)	Past producers; last optioned/worked by Noranda Mining and Exploration Inc.
Winston Lake 42D/14NW	Cu, Zn	598 000 t @ 1.0% Cu, 21.2% Zn (incl. 33% dilution)	Inmet Mining Corporation	Inmet Mining Corporation, pers. comm., 1999	Mine closed, February, 1999
Wisa Lake 52C/08NE	Li	330 000 T @ 1.15% Li ₂ O	Open for staking	Manager's Report, Lexindin Gold Mines Ltd. (1958)	Diamond drilling, 1950's

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REFERENCES

- Bajc, A.F. 1999a. Results of regional humus and till sampling in the eastern part of the Shebandowan greenstone belt, northwestern Ontario; Ontario Geological Survey, Open File Report 5993, 92p.
- Bajc, A.F. 1999b. Regional till sampling survey of the western part of the Shebandowan greenstone belt, northwestern Ontario; *in* Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p.39-1 to 39-5.
- Bajc, A.F. 1999c. Gold grains in till, western Shebandowan greenstone belt, northwestern Ontario; Ontario Geological Survey, Preliminary Map P.3417, scale 1:100 000.
- Bennett, G., Leahy, E.J., Donald, J.P., Frey, E., Kral, J.J., and Tortosa, D.J.J. 1987. Sault Ste. Marie Resident Geologist's Area, northeastern Region; *in* Report of Activities, 1986, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 134, p. 233-255.
- Dyer, R.D. 1999. Atikokan area high density lake sediment and water geochemical survey, northwestern Ontario: New Au and PGE exploration targets; Ontario Geological Survey, Open File Report 5986, 83p.
- Friske, P.W.B., Hornbrook, E.H.W., Lynch, J.J., McCurdy, M.W., Gross, H., Galletta, A.C. and Durham, C.C. 1991a. National geochemical reconnaissance lake-sediment and water data, northwestern Ontario (NTS 42D, 42E south); Geological Survey of Canada, Open File 2360.
- . 1991b. National geochemical reconnaissance lake-sediment and water data, northwestern Ontario (NTS 42C and 42F south); Geological Survey of Canada, Open File 2362.
- Geological Survey of Canada. 1997. Magnetic residual total field, Manitouwadge greenstone belt, Superior Province, Ontario; Geological Survey of Canada, Open File 3447, scale 1:100 000.
- Graham, A.R. 1930. Obonga Lake Chromite Area, District of Thunder Bay; Ontario Department of Mines Annual Report, v.29. pt.II, p.51-60.
- Hart, T.R. 1999. Geology of the Garden Lake greenstone belt, central Wabigoon subprovince; *in* Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p.27-1 to 27-8.
- Hinz, P., Landry, R.M. and Gerow, M.C. 1994. Dimension stone occurrences and deposits in northwestern Ontario; Ontario Geological Survey, Open File Report 5890, 191p.
- Hurst, M.E. 1931. Chromite Deposits of the Obonga Lake Area; Ontario Department of Mines, Annual Report, v.40, pt. IV, p. 111-119.
- Jackson, J.E. and Dyer, R.D. 1999. Shebandowan area high density regional lake sediment and water geochemical survey, northwestern Ontario; *in* Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p.41-1 to 41-5.

THUNDER BAY SOUTH DISTRICT—1999

- Johnson, K.W. and Blomberg, P. 1990. Geological evaluation of the Obonga Lake chrome [sic] property. A.C.A. Howe International Limited Report; Assessment files, 52H/13, 52H/14, Resident Geologist's Office, Thunder Bay.
- Karvinen, W.D. 1968. The origin and petrology of the mafic and ultramafic rocks of Obonga-Leigh lakes area; unpublished B.Sc. thesis, Queens University, Kingston, Ontario, 52 p.
- Kidd, D.F. 1933. Obonga-Kashishibog Area, Thunder Bay District, Ontario; Geological Survey of Canada, Summary Report, pt.D, p.16-37.
- Kustra, C.R. 1966. Obonga-Leigh Lakes Area, East Half, District of Thunder Bay; Ontario Department of Mines, Preliminary Report 1966-1, p.18-28.
- Kustra, C.R. 1967a. Obonga Lake Area, West Part; Ontario Department of Mines, Preliminary Map P.416, scale 1:15 840.
- Kustra, C.R. 1967b. Obonga Lake Area, East Part; Ontario Department of Mines, Preliminary Map P.417, scale 1:15 840.
- Lavigne, M.J., Scott, J.F. and Sarvas, P. 1992. Thunder Bay Resident Geologist District; in Report of Activities 1991, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 158, p.87-104.
- Lavigne, M.L. and Scott, J.F. 1996. Thunder Bay Resident Geologist District; in Report of Activities 1995; Ontario Geological Survey, Open File Report 5943, p.138-169.
- Milne, V.G. 1964. Geology of the Garden Lake Area, District of Thunder Bay; Ontario Department of Mines, Geological Report 25, 21p.
- . 1967. Geology of the Cirrus Lake-Bamoos Lake area, District of Thunder Bay; Ontario Department of Mines, Report 43, 61p.
- . 1968. Geology of the Black River area, District of Thunder Bay; Ontario Department of Mines, Report 72, 68p.
- Morris, T.F. 1999. Quaternary geology mapping and surficial sampling, Killala Lake-Coldwell area, northwestern Ontario; in Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p.38-1 to 38-7.
- Muir, T.L., Jackson, S.L. and Beakhouse, G.P. 1999. The regional framework of the Hemlo gold deposit; in Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p.15-1 to 15-7.
- Ontario Department of Mines-Geological Survey of Canada. 1963a. Kwinkwaga Lake, Thunder Bay District; ODM-GSC, Map 2179G, scale 1:50 000.
- Ontario Department of Mines-Geological Survey of Canada. 1963b. Manitouwadge Lake, Thunder Bay District; ODM-GSC, Map 2169G, scale 1:63 360.
- Ontario Geological Survey. 1991. Bedrock geology of Ontario, west-central sheet; Ontario Geological Survey, Map 2542, scale 1:1 000 000.
- Percival, J.A., Breaks, F.W., Brown, J.L., Corkery, M.T., Devaney, J., Dubé, B., McNicoll, V., Parker, J.R., Rogers, N., Sanborn-Barrie, M., Sasseville, C., Skulski, T., Stone, D., Stott, G.M., Syme, E.C., Thurston, P.C., Tomlinson, K.Y., and Whalen, J.B. 1999. Project 95034. Evolution of Archean

- continental and oceanic domains in the western Superior Province: 1999 NATMAP results; in *Summary of Field Work and Other Activities 1999*, Ontario Geological Survey, Open File Report 6000, p.17-1 to 17-16.
- Phelan, L.G. 1947. Report on the Garden Lake Property, Little Long Lac Mines Ltd., unpublished report, Assessment files (52H12/SW), Resident Geologist's Office, Thunder Bay.
- Rogers, M.C. and Berger, B.R. 1995. Precambrian geology, Adrian, Marks, Sackville, Aldin and Duckworth townships; Ontario Geological Survey, Report 295, 66p.
- Sage, R.P. 1999a. Geraldton-Longlac: A target region for kimberlite and/or diamond exploration; Ontario Geological Survey, Miscellaneous Paper 169, p.237-243.
- . 1999b. Regions possibly favourable for kimberlite exploration; in *Summary of Field Work and Other Activities 1999*, Ontario Geological Survey, Open File Report 6000, p.34-1 to 34-5.
- Sage, R.P. and Watkinson, D.H. 1995. Alkalic rocks of the Midcontinent rift; Field trip guidebook, in *Proceedings volume 41, pt.2a, 41st annual Institute on Lake Superior Geology*, Marathon, Ontario, 75p.
- Sage, R.P., Breaks, F.W., Stott, G.M., McWilliams, G.M., and Robertson, D. 1974. Operation Ignace Armstrong: Obonga Lake-Lac des Iles Sheet, District of Thunder Bay; Ontario Division of Mines, Preliminary Map P.963, scale 1:126 720.
- Schnieders, B.R. and Smyk, M.C. 1989. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1988*, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 142, p.133-155.
- . 1990. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1989*, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 147, p.139-159.
- . 1994a. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1993*, Resident Geologists, Ontario Geological Survey, Open File Report 5892, p.80-105.
- . 1994b. Schreiber-Hemlo Resident Geologist's District; in *Summary of Field Work and Other Activities 1994*, Ontario Geological Survey, Miscellaneous Paper 163, p.130-132.
- . 1995. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1994*, Resident Geologists, Ontario Geological Survey, Open File Report 5921, p.71-90.
- . 1997. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1996*, Resident Geologists, Ontario Geological Survey, Open File Report 5958, p.4-1 to 4-37.
- Schnieders, B.R., Scott, J.F. and Smyk, M.C. 1998. Thunder Bay South Regional Resident Geologist's Report: Thunder Bay South District; in *Report of Activities, 1997*, Resident Geologist Program, Ontario Geological Survey, Open File Report 5971, 56p.
- Schnieders, B.R., Smyk, M.C. and Hinz, P. 1991. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1991*, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 152, p.141-171.
- Schnieders, B.R., Smyk, M.C. and McKay, D.B. 1992. Schreiber-Hemlo Resident Geologist's District; in *Report of Activities 1991*, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 158, p.121-163.

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- . 1993. Schreiber-Hemlo Resident Geologist's District; *in* Report of Activities 1992, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 161, p.121-165.
- . 1996. Schreiber-Hemlo Resident Geologist's District; *in* Report of Activities 1995, Resident Geologists, Ontario Geological Survey, Open File Report 5943, p.78-109.
- Schnieders, B.R., Smyk, M.C. and White, G.D. 1988. Schreiber-Hemlo Resident Geologist's Area; *in* Report of Activities 1987, Resident Geologists, Ontario Geological Survey, Miscellaneous Paper 138, p.135-159.
- Thomson, K. 1995. Hemlo Gold Mines Inc., Report of Work, Smoke Lake Property; Schreiber-Hemlo Resident Geologist's District, assessment file F.N. 2.16114, Thunder Bay, 4p.
- Thurston, P.C. 1967. Obonga-Leigh Lakes Area (West Half); District of Thunder Bay; *in* Summary of Field Work, 1967, Ontario Department of Mines, Miscellaneous Paper 11, p.29-31.
- . 1968a. Leigh Lake Area; Ontario Department of Mines, Preliminary Map P.456, scale 1:15 840.
- . 1968b. Awkward Lake Area; Ontario Department of Mines, Preliminary Map P.457, scale 1:15 840.
- . 1968c. Kershaw Lake Area; Ontario Department of Mines, Preliminary Map P.458, scale 1:15 840.
- . 1968d. Badour Lake; Ontario Department of Mines, Preliminary Map P.459, scale 1:15 840.
- . 1968e. Goosander Lake; Ontario Department of Mines, Preliminary Map P.460, scale 1:15 840.
- . 1968f. Rabelais Lake; Ontario Department of Mines, Preliminary Map P.461, scale 1:15 840.
- Walker, J.W.R. 1967. Geology of the Jackfish-Middleton area; Ontario Department of Mines, Report 50, 41p.
- Williams, H.R. 1989. Geological studies in the Wabigoon, Quetico, and Abitibi-Wawa subprovinces, Superior Province of Ontario, with emphasis on the structural development of the Beardmore-Geraldton belt; Ontario Geological Survey, Open File Report 5724, 189p.
- Williams, H.R. and Breaks, F.W. 1989. Geological Studies in the Manitouwadge-Hornepayne region; *in* Summary of Field Work and Other Activities 1989, Ontario Geological Survey, Miscellaneous Paper 146, p.79-91.
- . 1990a. Geological Studies in the Manitouwadge-Hornepayne region; *in* Summary of Field Work and Other Activities 1990, Ontario Geological Survey, Miscellaneous Paper 151, p.41-47.
- . 1990b. Geology of the Manitouwadge-Hornepayne area; Ontario Geological Survey, Open File Map 142, scale 1:50 000.

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	Multiplied by	Gives	Imperial Unit	Multiplied by	Gives
LENGTH					
1 mm	0.039 37	inches	1 inch	25.4	mm
1 cm	0.393 70	inches	1 inch	2.54	cm
1 m	3.280 84	feet	1 foot	0.304 8	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	1.609 344	km
AREA					
1 cm ²	0.155 0	square inches	1 square inch	6.451 6	cm ²
1 m ²	10.763 9	square feet	1 square foot	0.092 903 04	m ²
1 km ²	0.386 10	square miles	1 square mile	2.589 988	km ²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
VOLUME					
1 cm ³	0.061 023	cubic inches	1 cubic inch	16.387 064	cm ³
1 m ³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m ³
1 m ³	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m ³
CAPACITY					
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	4.546 090	L
MASS					
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	31.103 476 8	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	0.453 592 37	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	907.184 74	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	0.907 184 74	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	1016.046 908 8	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	1.016 046 90	t
CONCENTRATION					
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.